

THE IRON AGE

New York, February 28, 1918

MAR 2 1918



This Austin No. 3 Standard Factory Building, 900 feet by 600 feet, 540,000 square feet, was ready for the owner in 55 calendar days after order.

Austin Standard Factory-Buildings

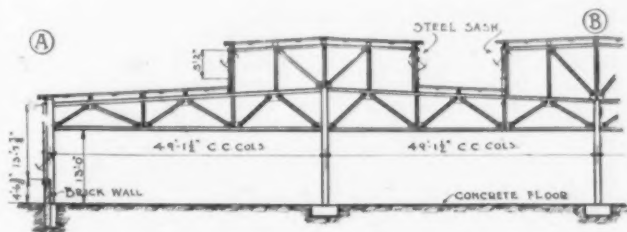
30 WORKING-DAYS after order 120,000 square feet of this Austin Standard No. 3 Building were ready for the owner. In 55 calendar days the entire building, 600 feet by 900 feet, 540,000 square feet of good clear-working floor area, was ready.

This building is essentially nine Austin No. 3 Standards, 100 feet wide and 600 feet long, placed side by side with extra monitors over the junctions.

The Austin Company holds in stock, in transit, and under order, all the essential materials for any one, or any combination of the nine types of Austin Standard Buildings.

The Standard cross-sections, from the 60-foot wide light machine-shop to the heavy erecting shops, have been found adequate, singly or in combinations, to meet almost any industrial need.

If you need a new building delivered on time, at a moderate cost, write, phone or wire the Austin office nearest the proposed work.



Cross-section of Austin Standard No. 3 showing how the units may be extended to any desired width. From A to B, leaving out the monitor under B, is the original Austin No. 3 Standard cross-section.

CLEVELAND 16112 Euclid Ave. Eddy 4500
NEW YORK 217 Broadway Barclay 6886
Philadelphia Bulletin Bldg. Spruce 1291
Washington 901 Fifteenth St. Franklin 3779
Detroit Penobscot Bldg. Cherry 4466
Indianapolis Merchants' Bank Bldg. Main 6428
Pittsburgh House Bldg. Court 1993



The Austin Company
*Industrial Engineers
and Builders*

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NATION WIDE STEEL-SERVICE

CHICAGO NEW YORK ST. LOUIS DETROIT



NEW YORK PLANT

IRON AND STEEL
REQUIREMENTS
FROM FOUR LARGE
STEEL-SERVICE PLANTS

JOSEPH T. RYERSON & SON
IRON STEEL MACHINERY

THE IRON AGE

New York, February 28, 1918

ESTABLISHED 1855

VOL. 101: No. 9

A New Method of Burning Powdered Coal

A Small-Diameter Low-Pressure Air Transport System Without Return Mains—Handling Coal as a Fluid—An Exact Furnace Feed

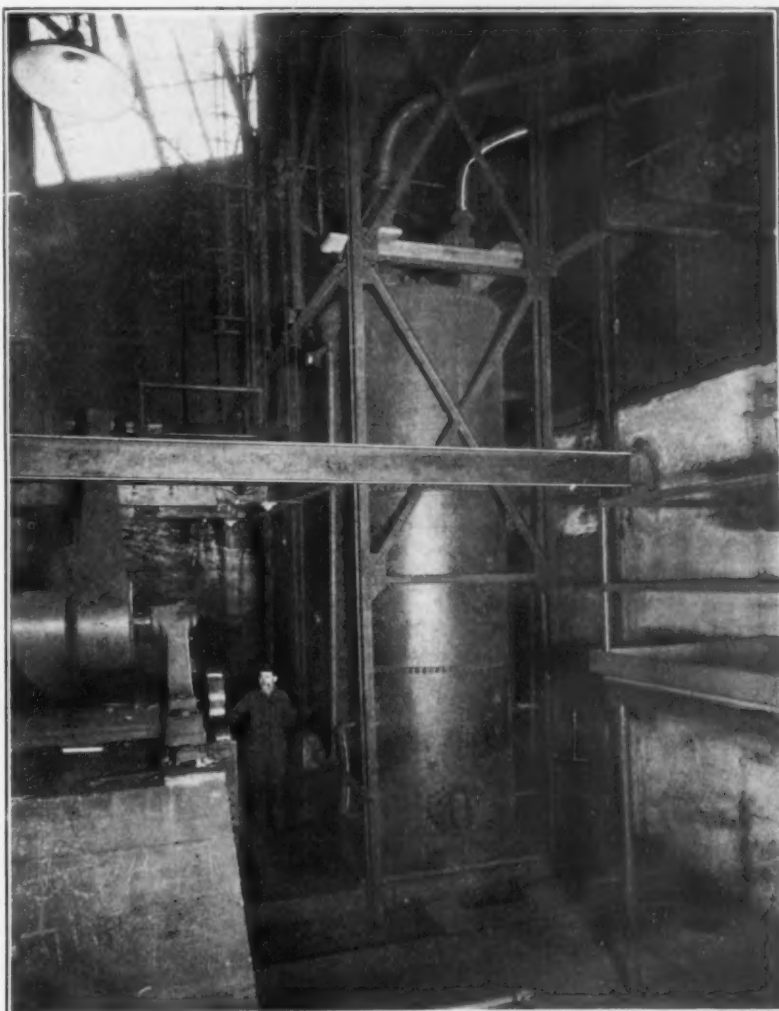
A FUEL system in which the fuel is delivered from the pulverizing plant to the point of use by means of air pressure in distinction from systems in which continuous helical screw conveyors are used or systems in which the coal is carried to the point of use by high-velocity air with the coal dust in suspension, has been put in operation at the plant of Dilworth, Porter & Co., Inc., Fourth and Bingham streets, Pittsburgh. The plant is noteworthy for the distances which the powdered fuel has to be carried, for the large size furnaces supplied and for the type of controller or feeder which delivers as needed from bins at the furnaces the amount of coal required for the conditions. It is noteworthy that the transport lines through which the powdered coal is brought are 4 in. in diameter throughout the plant, and this fact is emphasized as one of the economies as against the screw conveyors in the one kind of plant and large cross section air mains in other general types of plants. The engineering of the plant was done by the Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. The equipment has replaced natural gas, and it has been operating with marked success throughout the recent severely cold weather.

The conveying scheme is an application of the fact that the powdered fuel when thoroughly dry acts as a fluid and thus allows for installing piping of long lengths at any necessary tilt or angle. The powdered coal collected in tanks at the pulverizing station is subjected to air pressure in the upper part of the tanks and the coal as needed is forced from the bottom of the tank through the coal delivery or transport pipes. Coal has thus been delivered for a length of 1500 ft. The speed depends in part upon the air pressure. Four tons, for example, have been carried through a 550-ft. line in five minutes

with air at 40 lb. gage pressure. The coal is pulverized to pass 95 per cent through a 100-mesh sieve and 85 per cent through 200 meshes.

Run-of-mine or slack coal is discharged from the car into a steel track hopper, at the base of which a reciprocating feeder regulates the flow of coal into a 24 x 30-in. double spike roll crusher where it is reduced to 1¼-in. or smaller size.

By a steel leg chain and bucket elevator the fuel is then carried to the top of the pulverizing plant and dumped upon a rubber belt conveyor and carried to a magnetic separator pulley which removes the tramp iron. The refined coal



The pulverized coal is stored in two 5-ton so-called blowing tanks. The operator on signal admits compressed air above the coal and from the floor opens the valve to the 4-in. transport pipe through which delivery is desired. He watches a weighing dial to send the amount requested. Each transport pipe starts from a point near the tank bottom and passes out at the top



Slab Heating Furnace 70 Ft. in Length. The furnace heater is regulating the coal feed to one burner by means of chain and pulley operating a shutter-type controller

is deposited by screw conveyor in a steel storage bin of 700 tons capacity. It is admitted from there into a Ruggles-Coles rotary dryer of 10 tons per hr. capacity by opening a mechanically-operated gate at the bottom of the bin, which drops the coal upon a reciprocating feeder. A pyrometer with recording instruments at the discharge end of the dryer is used as the guide in firing the dryer furnace.

The coal, now containing less than 1 per cent by weight of normal moisture, is elevated by steel leg chain and bucket conveyor and loaded into a bifurcated spout directly overhead, discharging into two 5-ton bins supported on steel framework above 5-roller Raymond coal-pulverizing mills with air separation. The flow of coal to the pulverizers can be shut off when desired, by rack and pinion gates in end of spouts, and each mill is equipped with a compartment feeder for further regulating the amount of coal fed into it.

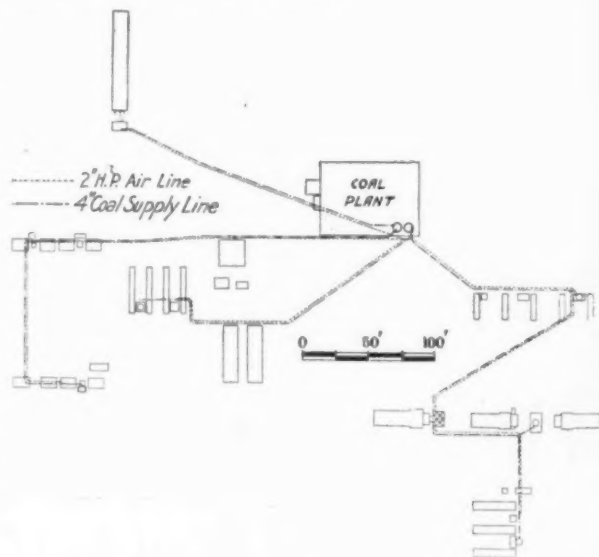
The pulverized coal is removed from each mill by an exhaustor or motor-driven fan, which, running at a constant speed, lifts by means of a partial vacuum all coal particles of sufficient fineness, and so automatically maintains a uniform fineness of product. The dust is carried up by pipe lines to cyclone separators and deposited into an 8-ton storage bin, the air released from the coal returning to the pulverizers.

Aside from the mechanically-operated gates at the bottom of the various coal bins all these operations are actuated by motor drives. The entire electrical control, including automatic starters, station switchboards and transformers, are mounted on a platform about 7 ft. above the floor, at one end of the building. The electrical wiring is so arranged that the machines can be started only in a certain sequence, which prevents any possibility of plugging the system; for instance, the raw crushed coal elevator must start before the crusher, and the dried-coal elevator before the dryer. Steel platforms with safety ladders afford easy access to all machinery.

To introduce the powdered fuel into the air transport system proper two blowing tanks, each of a capacity of 5 tons per charge, are located beneath the 8-ton storage bin. Each is set on a scale, provided with indicating dial, tare beam, etc., by which the operator can tell exactly how much coal is in the tank at any time. The mechanically-operated gate at the bottom of the bin is joined to the blowing tanks by means of spouts and flexible leather or canvas joint to permit of the movement involved in weighing.

Compressed air is supplied by a Laidlaw-Dunn-Gordon two-stage motor-driven air compressor, fitted with feather valves, which delivers into two air receivers, from which the air is admitted into the blowing tanks. An after-cooler is provided to remove moisture from the air as it leaves the compressor as well as to cool the air as it is being stored. In the head of the blowing tank there is a patented type of valve which is operated from the floor by means of levers and a locking mechanism. It controls the flow of coal into each tank and prevents the escape of air when closed. Each tank is fitted inside with two 4-in. blowing pipes starting just above the tank bottom, and fitted at the upper end with a control cock operated from the floor. Each blowing pipe is connected to a separate circuit, and delivers the coal to any furnace located on that line. A compressed air line is connected to the tanks near the top with suitable valve controls.

By signals the operator in the coal-milling plant is notified to deliver coal to whatever air transport line may be indicated. This is done simply by opening the cock on the transport line just above the tank. Upon receipt of signal from a hopper filler, who may be at any furnace in the mill, he opens the compressed-air valve above the coal in the blowing tank, and the air, acting as a plunger, drives the coal in a stream to the hopper.



Plan of 4-In. Air Transport System to the Several Groups of Heating Furnaces. The scale indicates the long distances traversed from the powdered coal mill to the furnaces

The Dilworth, Porter heating furnaces formerly burned natural gas, which is now entirely replaced by the powdered coal fuel. Twenty-six furnaces are used on a 10½-hr. turn, for heating steel used in the manufacture of railroad tie plates and spikes for railroad, ship and dock work. The division of work is:

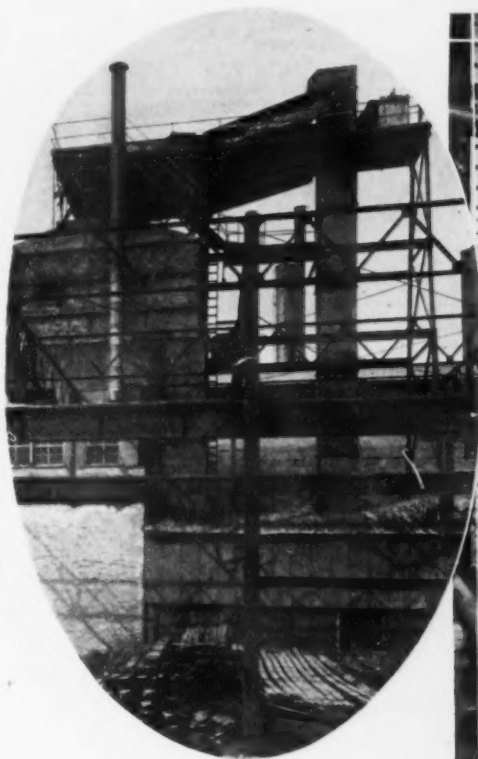
For small billets for the rod mill; one continuous heating furnace, 9 ft. 3 in. by 35 ft.; two, 7 ft. by 27 ft. 7½ in.

For large slabs to be rolled into strips for tie plate; two, 8 ft. 6 in. by 39 ft. 7½ in.; one, 8 ft. 6 in. by 68 ft.

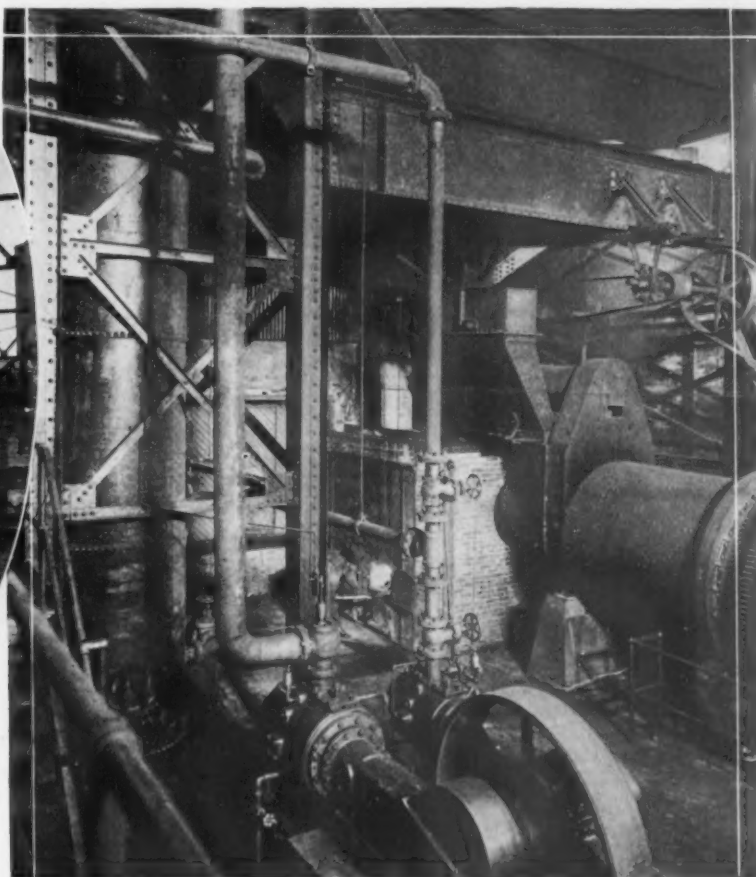
supplied with cold rods, which are fed into spike machines. These rods are produced in a rod mill from billets heated in the 9 ft. 3 in. by 35-ft. continuous furnace, and this same mill supplies cold rods for department No. 5.

Department No. 4 consists of the eight two-door furnaces, 4 ft. by 6 ft., taking short, cold rods from department No. 3, and feeding by hand into spike machines.

Department No. 5 has four tunnel furnaces, 2 ft. 5 in. by 30 ft., receiving rods from the rod mill in Department No. 3, and feeding into spike machines.



Outside of coal-milling building shows the crushed coal elevator, belt conveyor encased and 700-ton crushed coal storage bin. The discharge spout at its bottom is shown in the upper interior view above the brick combustion chamber of a rotary dryer. The air compressor seen in the foreground supplies air to the storage tanks at the left for use throughout the plant. By means of scale dials shown in lower view facing blowing tanks the operator weighs the coal before it is sent through the transport line. A belted motor is shown driving the fan that exhausts the powdered coal from the pulverizer directly underneath and lifts it to the cyclone separator above.

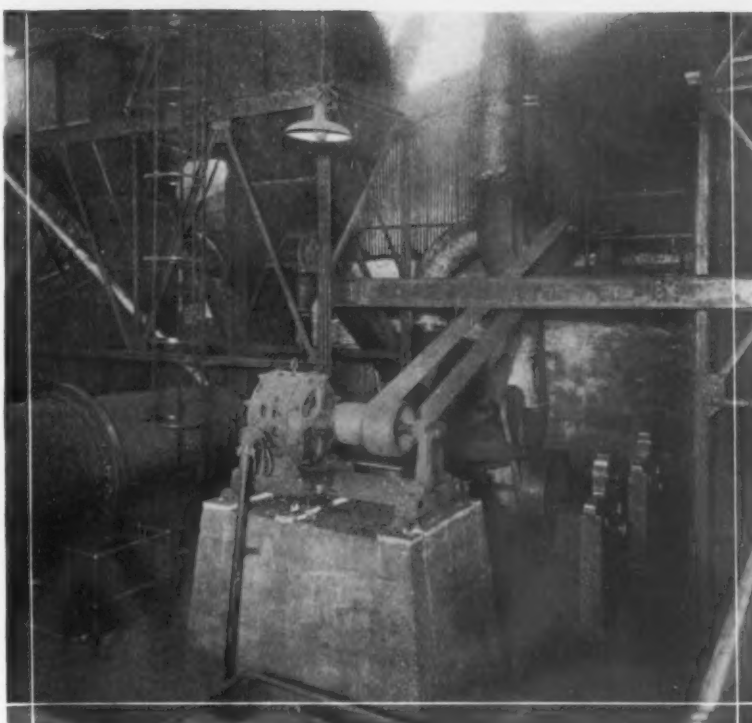


For heating rods for spike machines; three tunnel furnaces, 4 ft. by 30 ft.; five tunnel furnaces, 2 ft. 5 in. by 18 ft.; four tunnel furnaces, 2 ft. 5 in. by 30 ft.

For short rods for spike machines; eight two-door furnaces, 4 ft. by 6 ft.

In department No. 2 the two continuous billet-heating furnaces, 7 ft. by 37 ft. 7½ in., feed a rod mill, the bars from which are carried over hot and fed into the five tunnel furnaces 2 ft. 5 in. by 18 ft., from which they are drawn by hand and fed to spike machines.

In department No. 3 the three tunnel furnaces, 4 ft. by 30 ft., are



Slabs for making tie plates are heated in the 8 ft. 6 in. by 39 ft. 7½ in. continuous furnaces and in the 8 ft. 6 in. by 68 ft. continuous furnace which has recently replaced three Siemens-type furnaces. The large furnace will have a capacity of about 150 tons of billets per turn of 10½ hr.

The powdered coal is directed into bins at the furnaces where required, by means of special switching valves, operated from the floor by the hopper filler. The hoppers vary from 1 to 8 tons in capacity, according to the furnace consumption. Periodic inspection by the hopper filler warns him in every case when the hopper is emptied to a point requiring replenishment. He then opens the switch valve to that particular hopper and signals to the tender at the blowing tanks to turn on the air blast carrying coal to the point required.

To regulate the powdered-coal feed to the furnaces, controllers are attached to the bottom of the hopper, one for each burner. It consists of a cast-iron hopper casting bolted to the opening, with a spiral screw which feeds the fuel accurately to a cast-iron screen housing spaced from the hopper casting by a steel pipe. At the front of the hopper casting the thread of the spiral screw is interrupted in order to admit of the movement of two simultaneously operated shutters or gates controlled by levers on the outside, which regulate the amount of coal carried to the burners by varying the shutter opening. By this device exact feed of fuel is accomplished, a controller of 500 lb. of coal per hr. capacity, it is stated, having been adjusted to feed a minimum of 26 lb. per hr.

After passing through the worm, which is driven

by bevel reduction gears from the line shaft, the coal enters the cam-agitated screen, whence the particles are dropped uniformly to a siphon jet that picks up the dust with a 6-oz. air blast and transfers it through a steel pipe to the burner.

The burner is composed of a large cast-iron pipe with a specially shaped elbow. The coal-dust pipe is concentric within it, and extends almost to the furnace wall. The air for combustion enters through

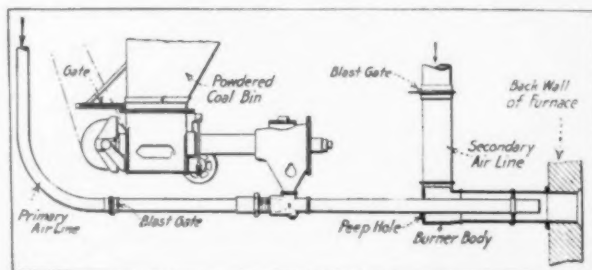
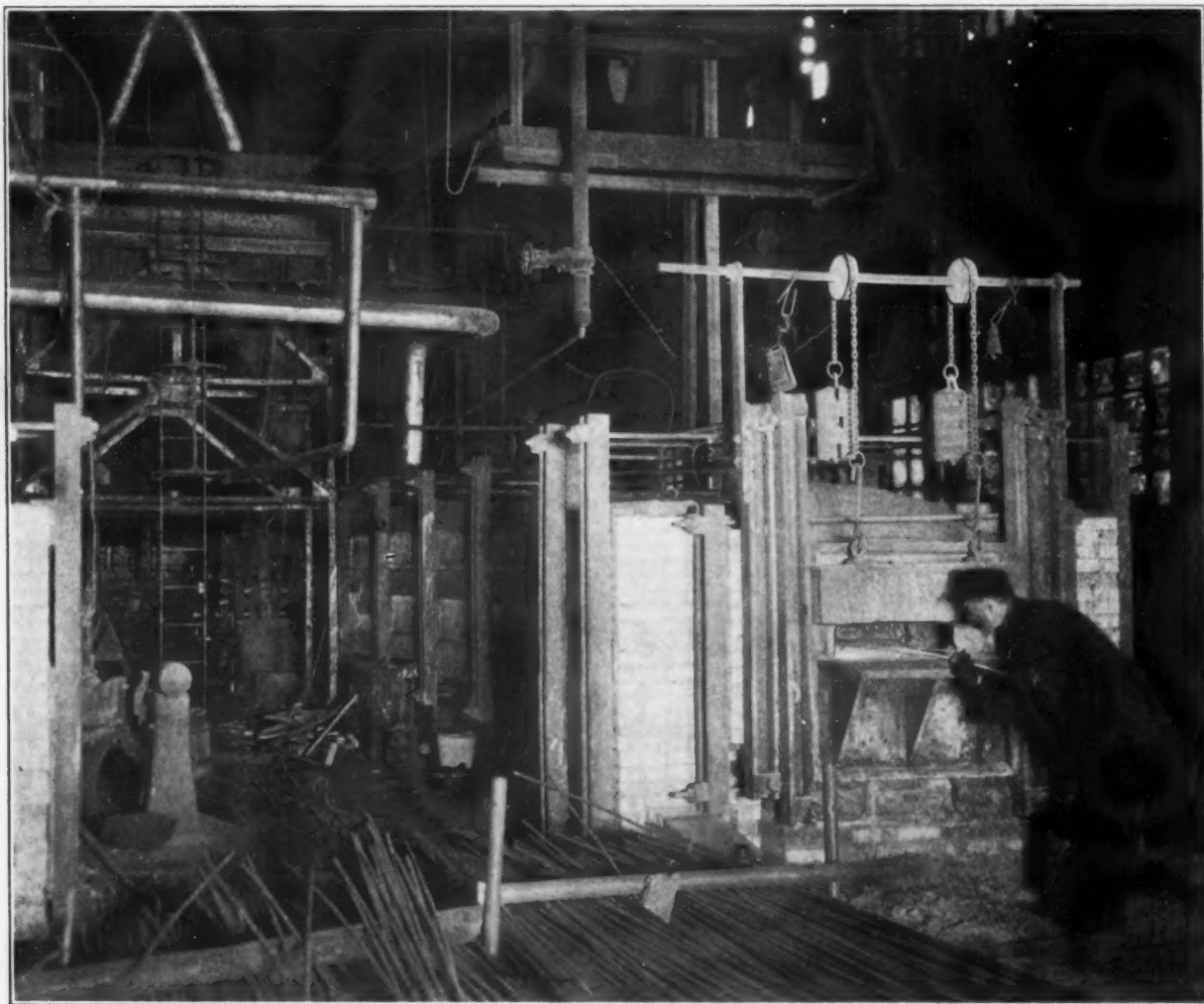


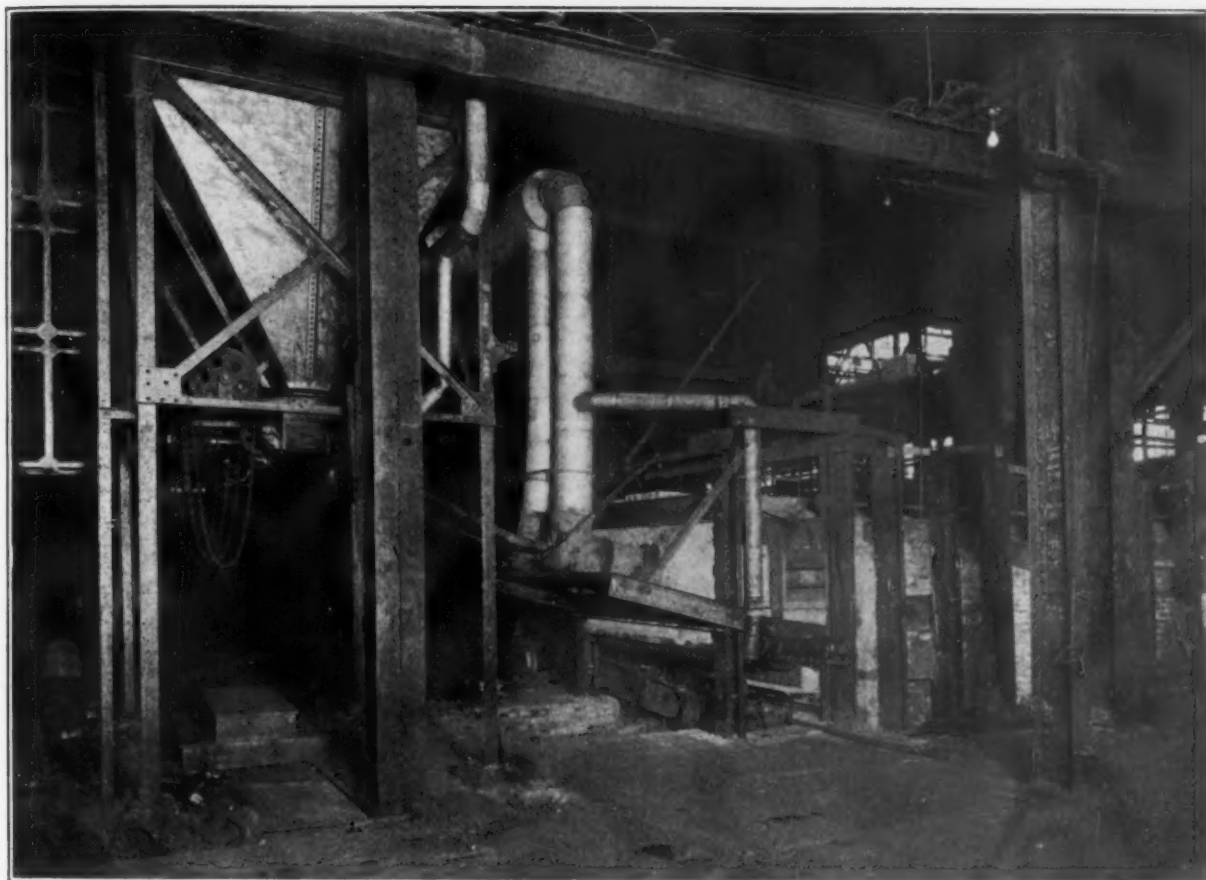
Diagram of Apparatus for Regulating Fuel Fed into Burner

the elbow under 1¼ oz. pressure, and the air transporting the coal, under a pressure of 6 oz., expands down to 1¼ oz., mingling with the combustion air at that same pressure as it burns.

The controllers can all be driven off one motor by means of interconnecting shafts or a line shaft, and require no variable-speed motors or devices. This method of feeding the coal, it is stated, insures accurate control at each individual furnace and burner, and permits the use of any flame from one of an oxidizing character to one highly reducing.



Bifurcated Hopper Feeding Into Two 4-Ft. By 30-Ft. Tunnel Furnaces. Safety ladder permits quick inspection of hopper supply and mechanism



Two-Burner Continuous Billet Heating Furnace, the Powdered Coal Feeding from the Hopper, Shown at the Left, Into the Small Primary Air Line Which Enters the Elbow of the Auxiliary Air Supply Line at Furnace, as Indicated in Diagram on Page 548

The steel as it comes from the furnace is said to be "softer" than that treated in natural-gas-fired furnaces; and it is reported that the absence of excess air reduces the formation of scale on the billets to a minimum, so resulting in a more penetrating heat. For this reason it is stated the hot billets are able to resist the formation of "cold spots" often caused in sliding them down the water-jacketed skid pipes from the furnace, and an easier-working billet is thereby secured.

The furnace temperature is regulated by the amount of coal passed into the burner through the shutter controller, and by the quantity of air. Air firing at the low pressure of $1\frac{1}{4}$ oz. is stated to be very desirable, as it reduces the abrasive action on the brickwork. Less excess air is required in burning powdered coal, it is found, than with almost any other fuel, powdered coal taking from no excess up to 30 per cent, as compared with 90 per cent to 125 per cent with hand-fired coal. This low per cent of excess air is said to account in a large measure for the soft heats and great economy.

There are 435,000 motor trucks in use in the United States, with an average capacity of 2.6 tons. If each truck hauled 25 per cent more, the increase in truck tonnage would amount to 339,300,000 tons a year. To determine average motor truck efficiency, R. E. Chamberlain, truck sales manager of the Packard Motor Car Co., recently conducted an analysis. A checker was stationed at a busy corner in Detroit for two hours to note the average truck load passing. An even 100 trucks were checked. Of these, 46 were empty, 30 carried partial loads and 24 were loaded to capacity. This shows an average operating efficiency of only 37 per cent.

The New York office of the C. W. Hunt Co., Inc., builder of elevating and conveying machinery and industrial railways, has been moved to 501 Fifth Avenue.

Revision of Coal Prices

WASHINGTON, Feb. 26.—The Fuel Administration is planning the comprehensive revision of the prices at which coal mined in various parts of the country shall be sold after April 1 and in this connection will make a number of important changes in the policy heretofore pursued, especially in the matter of grading coal as to quality and freedom from foreign substances.

"The regulation of coal prices by the Fuel Administration," said Dr. Garfield in an official announcement yesterday, "is the first attempt ever made, at least on a large scale, by the United States Government to fix and establish prices for any of the great industries. It is very important to both the public and the coal industry that the prices so fixed should be based on accurate information as to the conditions prevailing in different fields, and that, when once this information has been received, the right principles should be employed in making use of this information.

"The Fuel Administration believes that it has devised a speedy and accurate method for using the cost information which it has in hand, and that it has worked out the fundamental principles which should guide it in considering applications for modifications of coal prices.

"It is the purpose of the Fuel Administration to announce decisions on all applications for price revisions now before it, prior to April 1, 1918, and, prior to that time, to make such changes in the classification as seem to be necessary, in order to relieve uncertainty on this score as far as possible before the beginning of the new coal year."

Plans are being drawn for a large community hotel to be erected in the vicinity of the plants of the Curtiss Aeroplane & Motor Corporation and the Pierce-Arrow Motor Car Co., which are located near each other at Buffalo, to provide accommodations, with room and bath, for men working on war orders at these two factories.

TIME IN TEMPERING STEEL*

Excellent Properties in Rifle Barrels Obtainable from High Manganese Machinery Steel

BY A. E. PELLIS

THE time effect in reheating certain steels below the critical range is very marked. The increased toughness, shock-resisting power, and machinability of steel subjected to a long, high drawing temperature has been thoroughly demonstrated and is of practical importance, particularly in the manufacture of "smokeless" rifle-barrel steel.

The time effect in tempering is most important when a maximum drawing effect is desired, in which case maximum physical properties as well as ease of machining are important considerations. These are the conditions in drilling a rifle barrel. A hole, 0.30 in. in diameter and 24 in. long for the Springfield rifle, and 30 in. long for the Russian military rifle, has to be drilled in the heat-treated material. This barrel-drilling operation is probably the most difficult one in rifle manufacture, and anyone who has been connected with rifle manufacture knows how seriously production is affected when "hard" or un-uniform steel for barrels is encountered. The importance of high physical properties, tensile strength, toughness and resilience, in a rifle barrel is obvious.

The physical properties of two different lots of barrel steel are given below. The first lot, No. 1, gave serious trouble in the drilling operation. The second gave no trouble at all.

	No. 1	No. 2
Elastic limit, lb. per sq. in.	117,450	116,800
Tensile strength, lb. per sq. in.	132,500	131,750
Elongation, per cent.	16.0	20.0
Reduction of area, per cent.	42.1	51.0
Impact strength, ft.-lb. per sq. in.	450.0	520.0

This difference in machining and physical properties was due entirely to the time of reheating. The first lot was given a reheating time of 30 min., the second lot remained at the reheating temperature 2 hr. Both lots had been oil-quenched from 1500 deg. Fahr. and reheated to 1180 deg. Fahr. The time required in the reheating or drawing for the work to come to temperature was not counted. This time was approximately 20 to 30 min. The steel used has the following composition: Carbon, 0.54; sulphur, 0.050; manganese, 1.22; phosphorus, 0.065. The physical properties when untreated are as follows:

Elastic limit, lb. per sq. in.	69,800
Tensile strength, lb. per sq. in.	128,700
Elongation, per cent.	15.0
Contraction of area, per cent.	35.2

Further experiments established the fact that at least a 2-hr. reheating is necessary in order to have satisfactory machinability. Steel which, after treatment, gave elongation of 20 per cent or over gave no trouble in the shops. These results were backed up by hundreds of physical tests and production reports on thousands of barrels.

	Reheating Time				
	1 Hr.	2 Hr.	3 Hr.	½ Hr.	12 Hr.
Elastic limit, lb. per sq. in.	124,250	121,600	116,250	115,500	98,750
Tensile strength, lb. per sq. in.	137,000	135,600	125,900	135,400	116,500
Elongation, per cent.	17.0	17.5	19.0	17.5	22.0
Reduction of area, per cent.	42.2	45.4	47.6	52.7	57.2

A similar test with different-heat lots of steel indicates that greater increase in machinability, ductility and resilience can be obtained by making the drawing time still longer. The results of this test with drawing periods of 1, 2 and 3 hr., are given in the foregoing table, together with the results of another test made

with drawing periods of ½ hr. and 12 hr. The latter test was made with the idea of producing the maximum time effect.

It will be noted that there is a decrease in the elastic limit and tensile strength as the drawing time is increased, but that this is slight compared to the relatively great increase in ductility and impact strength. The decrease of elastic limit of less than 1 per cent is accompanied by an increase of 25 per cent in ductility as measured by elongation, and 13 per cent increase in impact strength.

In order to determine whether this effect was largely due to the high manganese content of the steels, an ordinary machining steel of the same carbon content was given a similar test. The steel analyzed: Carbon, 0.53; sulphur, 0.036; manganese, 0.65; phosphorus, 0.049.

Four specimens were oil-quenched from 1500 deg. Fahr., and drawn at 1180 deg. Fahr. for periods of ½, 1, 2 and 4 hr. respectively. The results follow:

	Reheating Time			
	½ Hr.	1 Hr.	2 Hr.	4 Hr.
Elastic limit, lb. per sq. in.	66,150	63,800	62,750	61,600
Tensile strength, lb. per sq. in.	101,250	98,250	97,250	96,600
Elongation, per cent.	23.0	26.0	28.5	28.5
Reduction of area, per cent.	60.8	67.5	65.0	65.8

In all of these experiments, the standard test specimens were prepared from the bar stock after the heat treatment. The original diameter of the stock was 1 1/32 in. The heat treatment was carried on in large-production furnaces, temperatures being controlled with carefully standardized Wilson-Macaulin pyrometers. The reheating time was not counted for the first 20 or 30 min. necessary for the pieces to reach furnace temperature. A reheating time of ½ hr., therefore, means at least 50 min. in the furnace.

For quenching, a straight mineral oil was used of 0.890 specific gravity at 60 deg. Fahr., 400 deg. Fahr. flash point and 200 sec. Saybolt viscosity at 100 deg. Fahr.

Since our measurements of strength, ductility and resilience are not absolute, and because of the inherent structural variations in steel, we cannot make exact conclusions from a few tests such as are given here. From daily contact, however, we acquire knowledge of these properties which we cannot easily record, but of which we are certain. I regard this knowledge from experience the best evidence, that increasing the time of reheating increases the ductility, toughness and machinability of the particular steels herein described, to a degree well illustrated in the above tests.

The excellent physical properties that can be obtained by properly heat-treating a machinery steel containing 1 to 1½ per cent manganese does not seem to have been generally recognized.

Will Expend \$25,000,000 More at Sparrows Point Plant

Charles M. Schwab paid a visit of inspection to the Sparrows Point property of the Bethlehem Steel Corporation, near Baltimore, one day last week. After the visit he announced that approximately \$25,000,000 had been so far expended in carrying out the original program outlined for Sparrows Point, following the acquisition of the old Pennsylvania Steel Co. He added that this amount represented about one-half of the total amount to be spent, and that the Maryland branch of the company will be made one of the finest steel and shipbuilding plants in the country.

For the purpose of aiding the manufacturers of Baltimore to secure contracts from the Government, the Merchants & Manufacturers' Association of Baltimore has collected and published a complete list of articles needed in the nation's war work. The association has issued this information, with a list of suggestions and the addresses of all the Government departments which should be addressed to secure the contracts in pamphlet form, and there is a great demand for it.

*A paper presented at the February meeting of the American Institute of Mining Engineers in New York, Feb. 20, 1918. The author is metallurgist, Springfield armory, Springfield, Mass.

Wage Scale and Conditions of Labor

Final Report of Shipbuilding Board—No Controversy as to Closed or Open Shop Will Be Tolerated—Bonuses and Premiums Abolished

WASHINGTON, Feb. 26.—A wage scale and an outline of conditions of labor in the Delaware River and Baltimore shipyards, which has been accepted by all the metal-working trades employed therein and which, it is to be hoped, will prevail throughout the period of the war, are embodied in the final report of the Shipbuilding Labor Adjustment Board which has just been filed with the Emergency Fleet Corporation. Both the scale and the pending rules are of much importance not only to the other shipyards of the Atlantic coast but also to all employers of labor for any form of metal working east of the Mississippi River. The wage scale in particular will exert an important influence throughout the eastern labor market, especially in view of the comprehensive campaign now being conducted by the Shipping Board to recruit workers for the shipyards of the Atlantic, the Gulf and the Great Lakes.

The board in its decision announces very positively that the controversy with regard to open and closed shops must not be injected by either employers or employees. The spirit of the ruling in this connection calls for the maintenance of the status quo when the board's investigation was undertaken and no discrimination between union and non-union men will be permitted.

The report of the labor adjustment board is based on the investigation undertaken at the instance of the Shipping Board to settle disputes which originally arose in the Delaware River district last October. These were temporarily adjusted by Vice-Chairman Stevens of the Shipping Board with the understanding that any wage scale subsequently determined by the adjustment board should be retroactive to Nov. 2, the date when the men returned to work. Although there is some question as to whether this understanding was intended to apply to yards in which disputes had not yet arisen, the adjustment board decided to resolve this in favor of the employees and to make the wage rates retroactive as regards the shipbuilding crafts to which they apply to Nov. 2 for all the shipyards in the Delaware River district actually engaged in the building of ships for the Navy Department or the Emergency Fleet Corporation.

Plants Included

The yards specifically included in the decision of the adjustment board are the following:

Chester Shipbuilding Co., Chester, Pa.
Harlan Plant, Bethlehem Shipbuilding Co., Wilmington, Del.
New Jersey Shipbuilding Co., Gloucester, N. J.
New York Shipbuilding Co., Camden, N. J.
Pennsylvania Shipbuilding Co., Gloucester, N. J.
Pusey & Jones Co., Wilmington, Del.
Sun Shipbuilding Co., Chester, Pa.
Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia.
Traylor Engineering & Manufacturing Co., Cornwells, Pa.

The decision will also apply to any other yards on the Delaware River having direct contracts with the Navy Department or the Emergency Fleet Corporation and to the following yards in the Baltimore district:

Baltimore Dry Dock & Shipbuilding Co., Baltimore.
Bethlehem Shipbuilding Corp., Sparrows Point, Md.
Henry Smith & Sons Co., Baltimore.

The rates of wages in the Baltimore yards are to be retroactive to Feb. 1.

Scale Is Retroactive

The board defends its action in making the new wage scale retroactive as to all yards irrespective of whether strikes have actually occurred therein on the ground that it has been convinced by the unanimous

testimony on both sides that a uniform minimum wage scale and uniform piece rates for all of the shipyards on the Delaware River from Bristol on the north to Wilmington on the south would be desirable and because limiting the retroactive provision to employees who actually struck would amount to penalizing those who, notwithstanding their dissatisfaction with conditions, remained loyally at work and thus be an incitement to future strikes.

For the Government-owned shipyards in which fabricated steel vessels are to be built at Hog Island and at Bristol, the board makes the wage rates retroactive to Jan. 15, the date on which the board held hearings on conditions in those yards.

The variable expense for transportation to and from work to which the employees of the yards up and down the river from Philadelphia are put owing to inadequate local housing facilities, the board finds to be the most serious obstacle to the maintenance of a uniform minimum wage scale in all of the yards of the district. To equalize this condition, the board authorizes shipyards, the employees of which are compelled to expend regularly more than eight cents for transportation to and from their work, to provide such employees with commutation or other tickets at the expense of the company. In providing free transportation for employees coming from a distance, each shipyard must adopt such precautions to prevent the privilege from being abused as may be prescribed by the auditors of the Navy Department and the Emergency Fleet Corporation.

Hours of Employment

Concerning hours of employment, the board finds that there is much diversity and confusion in the different yards growing out of the fact that although the eight-hour day has not yet been universally introduced, the half holiday on Saturday is an institution that is firmly established and tenaciously adhered to. Under the Federal eight-hour law, work in excess of eight hours in any calendar day for any department of the Government counts as overtime. In the light of these limitations imposed by law and local custom, the board prescribes the following rules to govern hours of employment in the shipyards referred to:

1. Eight hours shall constitute a day's work from Monday until Friday, inclusive, and four hours on Saturday.
2. Work in excess of these periods on any day shall be calculated as overtime and paid for at the rate of time and one-half.
3. Work in excess of 10 hours for any employee on any calendar day shall not be permitted, excepting in dry docks, or when ordered by the Navy Department or the Emergency Fleet Corporation, or to protect life or property from imminent danger.
4. Work on Sundays and the following holidays shall be paid for at the rate of double time: New Year's Day; Washington's Birthday; Decoration Day; Fourth of July; Labor Day; Thanksgiving Day and Christmas Day.
5. Men employed on night shift shall receive compensation 5 per cent higher than is paid to those employed on day shift.

Excessive Overtime

The purpose of the board in limiting the work of employees under ordinary circumstances to 10 hours a day is frankly stated to be "to discourage the practice of excessive overtime, which we believe leads to inefficiency and lessens rather than enlarges production and to encourage the introduction of the two and three-shift systems." The feasibility of working two or three eight-hour shifts in the eastern shipbuilding plants, the board asserts, has been conclusively demonstrated, and shipyard managers are strongly urged to take imme-

diate steps looking to the introduction of additional shifts in their yards with a view to increasing production and expediting the delivery of much-needed tonnage.

No More Bonuses

An important ruling embodied in the report of the board applies to shop management systems based on bonuses or premiums. In the course of its investigation of conditions in the various yards, the board found that in addition to the straight day wage and piece-rate systems there were in operation in different yards numerous bonus, premium and contract systems of wage payment. Without undertaking to determine the propriety of these methods of increasing production or limiting cost of output, the board states that the minimum wage scale and the piece rates prescribed by it are designed to introduce a greater degree of uniformity in connection with wage payments and that it is believed to be impossible to standardize the various bonus and premium systems so as to make it practicable to apply them generally in all the yards in question. The board therefore directs that "no bonus or premium in addition to the minimum rates and piece rates prescribed in this award shall in future be paid, except with the express permission of this board."

In certain departments of shipbuilding, and especially in the work of riveting, chipping and calking, the board found an actual preference for the piece-wage system on the part not only of employers but also the workers themselves. It has, therefore, been decided to authorize a scale of piece rates which represents the results of conferences between representatives of the yard owners and of the crafts concerned in which concessions in the interest of harmony and greater production were made by both sides. The board expresses the hope that this list of piece rates will be extended from time to time to include other operations and other types of vessels such as torpedo boat destroyers and cylindrical oil tankers, for which fair rates have not yet been ascertained.

Limited Work

One of the most important matters dealt with in the board's report is the existence among the workers in many of the eastern yards of rules or understandings limiting the amount that any one worker shall produce in a day. While many conflicting statements have been made as to the existence of these rules, the board states that adequate testimony was presented to prove that these understandings have been observed to a substantial extent and that they appear to have had their origin in the experience of the workers "of having the piece rate cut as soon as they showed an ability to increase their earnings beyond what the employer considered a normal wage." Recognizing the importance of a reasonable piece-rate system for the stimulation of production but desiring at the same time to protect the men against rate reductions that would operate unfairly, the board promulgates a comprehensive rule to

The piece rates prescribed as part of its award by the Shipbuilding Labor Adjustment Board, and printed in the piece-rate book for Delaware River shipyards, shall under no circumstances be lowered during the duration of the war. In the name of the people of the United States, we urge employees in shipyards to do their utmost toward winning the war by removing all limitations upon output and hastening in every possible way, each according to his capacity, the production of ships.

Shipbuilding Labor Adjustment Board.

meet the situation. "In the present national emergency," says the report, "it is vitally important that every limitation upon output be removed. Every shipyard worker must appreciate that he is fighting for his country when he drives a rivet or calks a seam just as

effectively as the soldier in the trenches when he wields his bayonet or fires a gun. And as the soldier is paid directly by the Government, so the shipyard worker must realize that he now receives his compensation from the Government, all shipbuilding now being upon Government account. To bring it home to piece workers that the Government is behind them and that they must be behind the Government, we direct that the following notices be printed and posted conspicuously in every department of every shipyard where piece work is carried on. [One of the notices is given in the preceding column.—EDITOR.]

The new wage scale is as follows:

Hammer and machine forgers, heavy.....	\$1.35
Anglesmiths and blacksmiths, heavy fires.....	.87½
Leading men, erecting department; gang leaders, mold loft85
Furnacemen on shapes and plates (ship work); loftsmen, first class.....	.82½
Operators, locomotive cranes in construction work....	.82
Flange turners, slab furnacemen, pattern makers, marine leaders, crane leaders.....	.75
Anglesmiths and blacksmiths, other fires; boltmakers; marine erectors and machinists, first class; fitters, first class; molders and coremakers; cupola tenders; loftsmen, second class, and pipe fitters.....	.72½
Levermen or cranemen, blacksmith shop; drop forgers; boiler makers; tank testers; hand chippers and calkers; coppersmiths; plumbers; electricians, first class; joiners; machine men; joiner department; operators, locomotive, cantilever, gantry and other cranes of over three tons; rivet testers; hand riveters; ship carpenters, first class; house carpenters; wood calkers; layers-out; sheet metal workers.....	.70
Leaders, furnace department; crane gang leaders.....	.67½
Acetylene burners and welders, first class; electric welders, pneumatic chippers and calkers; electricians, second class; fitters, second class; machine men, lumber department; engineers, locomotive; pneumatic riveters; ship carpenters, second class.....	.65
Marine erectors and machinists, second class; marine riggers; bending rollers; pressmen, first class.....	.62½
Burners, second class; regulators, first class; painters and polishers; cranemen; erector leaders, fasteners..	.60
Stage builders; mangle rollers.....	.57½
Anglesmiths' helpers, heavy fires; heaters, blacksmiths; hammer runner, heavy; blacksmiths' helpers, heavy fires; liner forgers; drillers; planer hands; leader, cleaning department; wiremen; firemen and helpers, furnace department; strikers, furnace department; wood reamers; punchers; planers and scarfers; countersinkers; press men, second class; offsetters55
Linermen54
Regulators, second class52½
Marine erectors, third class; machinists, third class....	.52
Grinders; chippers; cranemen helpers; drop forgers, helpers; holders-on; bolters; cementers; reamers, hand and machine chippers; locomotive conductors; road crane conductors; hoisting and portable firemen; erectors50
Sawyers47½
Burners' and welders' helpers; anglesmiths' helpers, other fires; blacksmiths' helpers, other fires; boltmakers' helpers; liner forgers' helpers; boiler shop helpers; coppersmiths' helpers; electrical department helpers; erectors' helpers; fitting-up department helpers; foundry helpers; hull engineering department helpers; machinists' helpers; riveters' helpers; ship shed helpers; sheet metal workers' helpers.....	.46
Bolters' and liners' helpers; cementers' helpers; joiners' helpers; lumber helpers; mold loft helpers; painters' helpers; ship carpenters' helpers.....	.42½
Laborers, rivet heaters, boiler shop.....	.40
Heaters38

In addition to the rates given above, the award also prescribes piece-rate scales for riveters, chippers, calkers, drillers, reamers and liner men. W. L. C.

A chrome ore facing in the upper part of the end wall of the gas down-take, immediately below the entrance of the gas port thereto, in an open-hearth furnace, is suggested by Thomas S. Blair, Jr., of Chicago, in a patent, U. S. 1,245,555. He states that in practice a furnace of this structure runs indefinitely without any slag accumulation and with no appreciable depreciation of the chrome ore body.

Patriotic Action of Employees

WASHINGTON, Feb. 26.—Realizing the necessity of assisting the government in the operation of the railroads on a more efficient basis, and to meet the present emergency in the repairing of locomotives, the shop employees of the principal railroad systems of the country, acting through A. O. Wharton, president, railway employees' department, American Federation of Labor, and the international officers representing the machinists, boiler makers, blacksmiths, carmen, sheet-metal workers, electrical workers and apprentices and helpers have patriotically agreed to the following changes in reference to working conditions:

1. The hours of labor in shops and roundhouses to be governed by the necessities as indicated by the general condition of equipment. At shops and roundhouses now working one shift which totals less than 70 hours per week, an increase, preferably on a 7-day basis, may be made. Where desired, working hours may be so arranged that men will be released at 4 p. m. on one day each week. Existing working agreements to govern the rate, subject to the action of the Railroad Wage Commission.

2. All apprentices who have served three years may be promoted to mechanics and paid the going rate of wages for that position. Such promoted apprentices to be given the right of practical experience on work of their respective trades to which they had not been advanced during the three-year period.

3. Helpers in their respective trades who have had five or more years' experience may be promoted to classification of mechanics; they to receive mechanics' rate and be given an opportunity to learn all branches of the trade. The duly authorized committeeman of each trade in each shop covered by agreement shall be consulted, and mutual understanding arrived at in promoting helpers, and the ratio of helpers to be promoted, to the number of mechanics, in any one trade in any one shop, shall not exceed 20 per cent. The international officers and general chairmen of each trade on each road covered by agreements shall be furnished a complete record of the men promoted.

4. Mechanics applying for employment will not be denied such employment for any cause other than inability to perform the work; this preference rule to be in effect as long as three-year apprentices or promoted helpers are employed at mechanics' rates.

5. Where a reduction is made in the force of mechanics, promoted helpers in accordance with their seniority shall be set back first; then advanced apprentices; no mechanics to be laid off until all such promoted helpers and apprentices have been set back.

6. The promotions above referred to are to meet an emergency caused by the war and shall cease at the close of the war.

In appreciation of the patriotic action of the shop employees, Director General McAdoo has officially promulgated the above agreement and has thanked President Wharton as the official representative of the workmen.

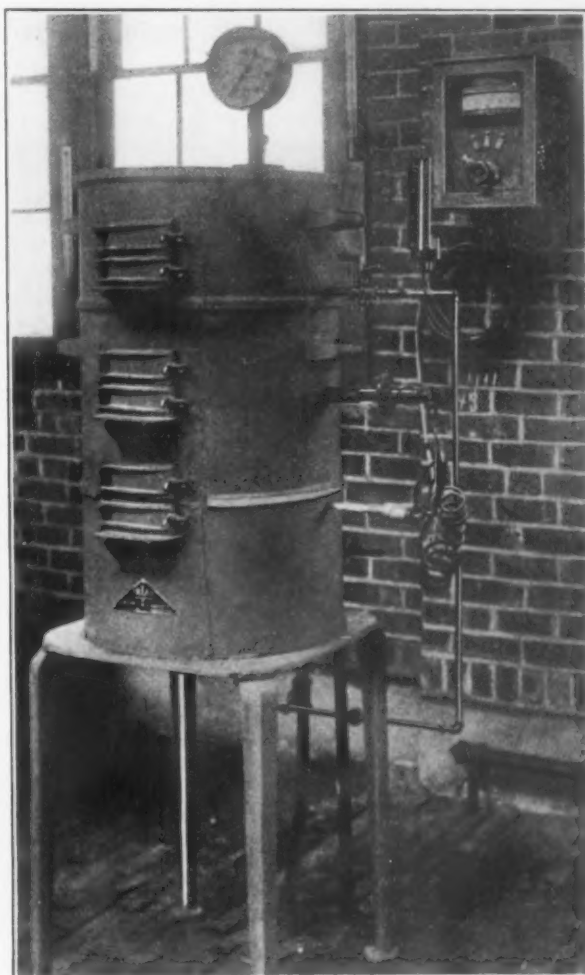
Cutler-Hammer Opens Washington Office

A Washington office has been established by the Cutler-Hammer Mfg. Co. H. W. Knowles of the New York office has been put in charge and the office is to remain at the Capital for the period of the war. Mr. Knowles entered the service of the company shortly after being graduated from Cornell University in 1912. He spent nearly five years in the shops, engineering department and sales department of the company at Milwaukee, and since May has been identified with the New York district office in the Hudson Terminal Building. The Washington headquarters will be at the Bradford, Eighteenth and K Streets.

The Ranken School of Mechanical Trades at St. Louis, by arrangement with the United States Government, has undertaken the training of aviation mechanics in squads of 250, who are to be given a four weeks' course and then transferred to other points for other training. The first squad of 250 is now undergoing the course and has been quartered close to the school in a hotel commandeered for the purpose, where the men are kept under military discipline while taking instruction.

A Special Tool Steel Heating Furnace

For heat treating carbon and tungsten steel tools of every description a rather interesting furnace has been patented by W. R. Bennett of the Bennett Metal Treating Co., Elmwood, Conn. It is designed as a substitute for the three separate units required to preheat



Preheating, High Heating and Drawing the Temper of Steel Tools Can Be Accomplished in a Single Special Furnace Instead of Three Separate Units

the steel to about 1500 deg. Fahr., removing the steel to another furnace heated to a temperature of between 2200 and 2350 deg. and finally quenching or cooling from the high temperature, and drawing the temper by an oil or lead bath or dry heat. In this new furnace which is known as the Triad the three steps can be accomplished simultaneously with the use of a single burner employing either fuel oil or gas.

The furnace is cylindrical in shape, a feature of design which is relied upon to insure uniform temperatures and the elimination of cold corners, and operates with a single burner which is not built into the furnace. There are three chambers, the lowest one for hardening, the intermediate one for preheating, and the top one for drawing the temper. The temperatures in both the intermediate and the lower compartments are determined by a pyrometer and a thermometer is employed to determine the drawing temperature in the top division. This is controlled by an air inlet from the main air supply line and is operated by a valve and mercury air gage. It is pointed out that both the intermediate and the lower chambers have a reducing atmosphere, thus preventing pitting or scaling of the steel that is being heated.

The furnace which is operated by one man will handle milling or forming cutters up to 4 in. in diameter and 10 in. long. The time required to bring the lower compartment to the proper hardening temperature from a cold start is 10 min. when tool steel is being treated and 20 min. with high-speed steel. The temperature can be increased from the preheating one of 1500 deg. to 2250 deg. in a short space of time.

American Institute of Mining Engineers

Erosion of Guns and Steel Rail Fissures Discussed at February Meeting — Steel Fusion Welds and Copper in Steel—Employment Problems

GUN erosion and transverse fissures in steel rails were the two most important topics discussed at the iron and steel sessions of the 116th meeting of the American Institute of Mining Engineers in New York last week, Feb. 18 to 21. The meeting this year was no exception to its predecessors in the importance and value of the steel papers presented and discussed. While not so many papers were scheduled as on former occasions, the attendance was fully as good despite the war and the discussions were full of interest. It was an unusual occurrence, however, that so many written discussions were presented and read. These always fail to instill the interest that the oral effort brings out.

Erosion of Large Guns

Hudson Maxim, chairman of the Committee on Ordnance and Explosives of the U. S. Naval Consulting Board, presented in abstract Dr. Henry M. Howe's paper on "The Erosion of Guns." A synopsis of this voluminous paper was published in *THE IRON AGE*, Feb. 7, 1918. It is generally regarded as the most important contribution on this subject ever published.

Mr. Maxim, in presenting in his own words the significant parts of Dr. Howe's paper, interspersed the abstract with comments of his own. In his opinion, gun erosion, especially in large caliber guns, is the most important problem confronting ordnance experts. The Navy has worked many years on it, he said, but there was much yet to be accomplished.

Early in the war it was decided to approach the problem from every angle and Mr. Maxim was asked to direct the research. Dr. Howe was called upon to go into it to the bottom. Mr. Maxim stated that Dr. Howe had helped in every possible way and that the work he had done had been more than considerable. He regarded this paper as a "poem of 25,000 words, so full is it of wonderful language and imagination and of word painting of a complicated subject." The problem has puzzled scientists for many years, but Dr. Howe might be termed the Sherlock Holmes of science—so far at least as this problem is concerned.

Less Frequent Relining Necessary

An indication of the importance of this problem may be obtained by realizing that it costs over \$14,000 to reline a 14-in. Navy gun. The necessity for relining used to occur much more frequently than it does now. While many important facts cannot now be revealed, it can be stated that the Navy, since Dr. Howe's work, has made important progress and it is now possible to fire 250 rounds accurately from a 14-in. gun or to keep a gun in commission long enough to use the ammunition which a ship can carry in two trips before relining is necessary. This was never possible before.

Mr. Maxim made the emphatic statement that while much had been heard of German progress in gun steel or gun efficiency, it would not be better steel in German guns that would win the war. The powder charge is an important phase of the erosion problem, Mr. Maxim said. While formerly a rifle could only fire 3000 to 5000 rounds, the powder has been so improved that now such rifles will fire 20,000 rounds.

Rear Admiral Ralph Earle sent a written discussion which was read by Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa., who presided at the meeting. Admiral Earle said that Dr. Howe's work proves that the erodible mobility of the metal was due to the rush of gases and that heat cracks are due to the liquifaction and sudden cooling. An original feature of the paper is the proof that copper is torn from the band of the projectile and deposited in the liner. This is caused

by cracks biting off the copper, but the fact has no significance or vital importance, in the Admiral's opinion.

While Dr. Howe explains that heat cracks are deepened by copper deposits, Admiral Earle contended that this is not so because there are more heat cracks in the powder chamber. It is also a fact that erosion or bore enlargement is not uniform; it is due to the gradual wearing by the gases and to irregular wearing in gutters. New liners are the surest prevention of or antidote to erosion. Oiling of the bore lengthens the life. In small guns such procedure has increased the life 85 per cent. For such purposes, sperm oil is better than graphite.

It has been contended by some that cracking of the bore does not weaken the gun. It certainly does, said Admiral Earle, for the cracks may go deeper and into the tube.

J. C. Unger, manager research department, Carnegie Steel Co., Pittsburgh, read a discussion of Dr. Howe's paper from the practical standpoint, an abstract of which is as follows:

"A 14-in. gun costs about \$60,000 and has to be relined after about 170 shots have been fired, or its actual firing life has been 10 sec. The cost of relining the gun once is about \$18,000. During war, or when the gun is in actual service, it must be in the shop approximately 40 per cent of the time for repairs. If the 14-in. gun fired 170 shots during the first seven months of a year, it would be in the shops for the following five months of the year for repairs. When this is considered, the importance of this side of the problem must be evident.

Some Gun Steel Requirements

"In order to have the tube of an unlined gun or the liner of a lined gun, which are the parts affected by erosion, accepted by the purchaser, it must conform to the following requirements:

The ingot must be made by approved methods.

The ingot must be of such size as to permit of a reduction in cross section during forging of 4 to 1 when compared with the finished forging.

The forging must be annealed, then rough bored and turned, then heated and quenched in a cooling medium, followed by a final heating or tempering treatment at a lower temperature than the preceding treatments.

At each end of the treated forging four tangential tensile tests, 90 deg. apart, are taken, which must show the following qualities for a 14-in. gun:

Elastic limit.....	46,000 lb. per sq. in.
Ultimate strength.....	86,000 lb. per sq. in.
Elongation in 2 in.....	18 per cent
Reduction of area.....	30 per cent

The steel must be readily machined.

The finished gun must stand a proof or firing test, or be subjected to an internal gas pressure of about 35,000 lb. per sq. in. without deformation.

"Other requirements could be given, but these are the principal ones, a study of which indicates that a plain carbon steel of about 0.50 per cent carbon or an alloy steel of about 0.40 per cent carbon are the only materials available at this time which will meet the preceding requirements.

"Many reasons have been given as the cause of erosion, the principal ones being: High temperature, high pressure, mechanical abrasion by the projectile in the bore of the gun, rush of gas ahead of the projectile, gas at high velocity behind the projectile, and the sand blast effect of the grains of powder.

"Without attempting to specify which cause is responsible, they may produce carburization of the metal, hardening and cracking of the surface, wearing or washing away of the metal, depositing of copper, iron

or their oxides in the cracks, and the production of a different macroscopic and microscopic structure in the part affected. Many of these results have been known for a number of years, and, at the best, are of little direct value in correcting the trouble.

A Less Corrodible Metal Necessary

"As pointed out by Professor Howe, we are interested in the solution of the problem from one side only, the use of a metal or alloy which is less erodible than steel. An examination of the results of actual experiments made with different metals shows results which at times are conflicting. We find a Parson manganese bronze and a cast iron have given poor results when compared with steel under actual firing tests. Aluminum bronze in a small arm gave good resistance to erosion, but failed on account of lack of strength. Alloys used in tests in bombs were poorer than steel. Three steels of 0.30, 0.40 and 0.90 per cent carbon, when used as liners in a gun with modern powder chamber pressures, showed the higher the carbon or the hardness, the greater the erosion. Three steels of about 0.22 per cent carbon, and of as near the same chemical composition in other respects as it is possible to produce commercially, ranked first, fifth and tenth in their resistance to erosion in a firing test. Wrought iron and soft steels appear to show good resistance to erosion in some tests, but such material will not meet the requirements of the present specifications.

"Copper vents fastened in the body of a gun, which permitted the escape of gases only, gave good results, but not comparable with the effects produced in the bore of a gun which resisted the gases and the mechanical abrasion. Plugs of various metals fastened in the orifice of bombs and subjected to heat and gas pressure were not satisfactory. Plugs inserted in the breech blocks of guns were in the same class. The erosion in the powder chamber of a gun is very small when compared with that at the origin of the rifling. The effects of forging the steel seemed to give some promise, as the greater the work done in forging, the better the resistance, until it was shown that when a great deal of work was done the steel was inferior in its resistance to erosion.

Substitutes for Steel Liners

"Any substitute for a regular steel liner must not crush or burst during service. Bursting may be prevented by supporting the lining material by the tube and jacket. It must have sufficient longitudinal strength to prevent rupture, with consequent blowing out of the gun. This might be prevented by proper support of the surrounding parts. *It must be readily machined.* If a substitute metal or alloy be found which gives better resistance to erosion than steel, its cost is limited by the extra life it has above steel. This would be largely modified, however, by the advantage of possessing, in a case of great emergency, a gun with a much longer firing life.

"Tungsten and molybdenum have been suggested as substitutes, but they are not easily machined, particularly tungsten, even when in the ductile condition. To prepare ductile tungsten in masses sufficiently large to be used for even a part of a liner would be almost impossible. Both metals oxidize easily at a red heat, and each absorbs carbon under proper conditions, becoming brittle. Their alloys with aluminum or copper, or with each other, may show better results than the metals alone.

"I do not know what has been tried by those who have investigated the subject from a practical standpoint, consequently the suggestions I am making for a reduction of erosion may have been investigated by others. Alloys of nickel and chromium are commercially produced, and could be obtained in sizes from which liners could be made. These alloys have properties, when subjected to high temperatures, which recommend them.

"A roll for a rolling mill is used under conditions of high temperature, pressure and abrasion, resembling the conditions in firing a gun. When a comparison is made of a steel plate mill roll with a cast iron roll, or

a chilled cast iron roll, with or without the addition of nickel and chromium, it is found that the chilled iron roll has a much longer life before requiring redressing than either of the others.

"It may be possible to deposit electrolytically a heavy shell of nickel, copper, bronze, brass or even iron on the inside of the tube, and then bore out and cut the rifling in this shell. The greatest progress in reducing erosion has been made by changes in the character of the powder, and size and shape of the grains, but it leaves much to be accomplished.

"My belief is that any pronounced relief will not be obtained by a study of the effects of erosion, but by actual trials of the more common metals as a liner. These tests must be made in the bore of the gun, not in bombs, the breech block or in the powder chamber."

The Metallographic Phase

Discussing the paper from a metallographic standpoint, Zay Jeffries, director of research, Aluminum Castings Co., Cleveland, Ohio, read portions of a long review of Dr. Howe's work. He characterized the paper as a "wonderful" one and stated that Dr. Howe's explanation of the martensitization is so clear that one can almost see the sub-microscopic particles of the sorbite merge to form the austenite and then change to martensite on cooling.

"That the hardened layer is martensite there seems to be little question," said Mr. Jeffries. "It is, however, not the usual type of martensite which is encountered in heat-treated steel. . . . The martensite at the surface of the gun bore is harder than ordinary martensite of the same carbon content. This excess hardness is in keeping with the general proposition that martensite of a given carbon content is harder when produced from small austenite than from large austenite grains."

"There is another point," said Mr. Jeffries, "which may have greater bearing on erosion than the change in melting point. This is the increase in cohesion of the white hot steel, due to the pressure of the gases. The modulus of elasticity of the white hot steel is very low and the action of the pressure tends to force the molecules closer together than they would ordinarily be at the same temperature, and this increases the cohesion.

Effect of White Hardness and Grain Size

"After weighing many factors Professor Howe attributes the greater part of the erosion to the action of the heated gases in motion," continued Mr. Jeffries. "This idea is also held by many others. To resist the erosive action of the gases it is suggested that a metal should have the property of white hardness. In any given metal or alloy composed largely of one component, its white hardness will be the greater the larger its grain sizes.

"I have shown that in all single component metals there is a temperature at which the cohesion, as measured by either the first permanent deformation or by the amount of deformation under a load somewhat above the elastic limit, is independent of grain size. It is true that this temperature increases as the rate of application of the load decreases, but the normal position of this point, which I have called the equi-cohesive temperature, my interpretation being that it is the temperature at which the amorphous phase has the same cohesion as the crystalline phase, is about the same as the recrystallization temperature of the particular metal under consideration after severe cold work. In iron, for instance, the equi-cohesive temperature is about 550 deg. C. Above this temperature iron becomes softer as the grain size decreases; below it iron becomes harder as the grain size decreases. Any metal in the temperature region of grain growth in the solid state will be harder as the grains become larger. The difference in grain size makes but slight difference in hardness near the equi-cohesive temperature, but as the melting point of the metal is approached the fine grained material is very much softer or less cohesive than the coarse grained material.

"It does not seem possible to heat any of the steels now used for gun liners to temperatures near their melting points without at the same time producing very

fine grained structures. For example, the austenite grains may be considered to be very small—perhaps sub-microscopic—under the firing conditions. With a very low carbon steel the ferrite, on changing to gamma iron, might also be expected with the very rapid heating conditions to change into very small grains of gamma iron. The same would be true of a liner of pure iron. The successive rapid heatings should produce very small grains of gamma iron when the metal is heated to a temperature even near melting. Inasmuch as small grains, other conditions being equal, should reduce the white hardness of the iron or steel, might we not expect greater resistance to erosion in a material in which fairly large grains were stable even up to the melting point of the metals?

Silicon Steel for Gun Liners

"To meet the conditions of high melting point and high heat conductivity and yet maintain a large grain size at high temperatures seems very difficult. Silicon steel has a rather high melting point, although not so high as carbon steel. It can be produced, however, with a large grain size, and these grains are stable up to the melting point. It would be interesting to test some silicon steel erosion plugs with varying grain size. Even if this material does not prove as resistant to erosion as the steels now in use, the information regarding change in grain size would be definite and possibly valuable.

"The results of Admiral Earle with annealed steel would indicate that pure iron resists erosion at the high temperatures better than austenite containing considerable carbon. Even though the gamma iron would have a small grain size due to the extremely short time available for growth to take place, it would still have a grain size much greater than that of austenite containing considerable carbon and, consequently, it would contain less amorphous iron. If some way could be devised to keep the ferrite grain size larger I should think that the tendency would be to reduce the erosion. Besides increasing the white hardness, the coarse grained material would offer more resistance to melting than fine grained metal."

Transverse Rail Fissures

J. E. Howard, engineer-physicist, Interstate Commerce Commission, Washington, presented an abstract of his paper, "Transverse Fissures in Rails." It is a summarization of data that he has collected in his numerous investigations of rail failures. A discussion of the subject of transverse fissures essentially becomes a discussion of fatigue fractures since they are identical. In concluding his paper, Mr. Howard said:

Attention has so generally centered upon the results of the drop test, the bending test, or the tensile test, in respect to the display of primitive ductility, that the phases through which rupture is reached by repeated stresses have not received adequate consideration. Specifications governing the acceptance of the metal rigorously demand that a certain elongation shall be displayed. The elongation called for may be only a few hundredths of an inch per inch of length of sample, but such display is made the decisive measure for the acceptance of the steel. It would not be incompatible with experimental results for the steel which was deficient one-hundredth of an inch in its primitive display of elongation to show under repeated stresses an aggregate elastic extension of several miles, so radically different may be its primitive behavior and its behavior under long-continued alternate stresses.

In like manner, chemical requirements are frequently made the object of exact fulfillment. Without advancing other reasons, the cause of the failure of materials under service conditions has been attributed to some slender deficiency in fulfilling the specifications on which the material was supposed to be made. It is not always clear that the most suitable steel for the purpose is asked for in specifications. Attributing the cause of failure of a rail to the use of one deoxidizer or another, or to an excess of some non-metallic constituent above prescribed limits, can hardly carry conviction in the absence of information which connects them as cause and effect, if they stand to each other in that relation.

It is desired to emphasize the fact that the durability of a rail consists of its ability to retain its integrity under re-

peated deformations. A direct test consists of subjecting the rail to repeated deformations, conducted upon the shape and dimensions in which it is used. The results of other tests may be accepted as indexical of the properties desired, provided the relations between the two are established. In general, however, direct methods are preferred to indirect ones.

In order to show the diversity of views and opinions which have been expressed upon the causes of transverse fissures, Mr. Howard gives in his paper an extract from the report of the committee on rails and equipment, of the National Association of Railway Commissioners, at its twenty-seventh annual convention, San Francisco, Cal., October, 1915, which outlines twenty-five different possible causes for rail fissures.

F. A. Weymouth, rail sales department, Bethlehem Steel Co., South Bethlehem, Pa., read a discussion of Mr. Howard's paper, a portion of which is as follows:

"I think the first questions that come into the minds of those who have read of the determination of these stresses are: Is it possible to measure specimens of steel with accuracy to the small fraction of an inch as reported? and Is this a practical test? It has been my privilege to work with Mr. Howard on a small portion of this work and I can say that the measurement of these strains to the degree of accuracy reported is a very practical laboratory test.

"These conclusions, which form the basis of this paper, show without any doubt whatever that the so-called transverse fissures are absolutely nothing but fatigue failures, which are formed in rails by a combination of internal strains in the rails and the service to which they are subjected.

"The obvious, ideal remedy would be to reduce wheel loads, build our roadbeds as permanent right-of-ways with rigid foundations to eliminate as far as possible bending moments and vibration, and produce rails with no internal strains. But such things cannot be. Economic conditions make it absolutely necessary that wheel loads remain where they are, if not increase, in the near future. We cannot look for any radical change in the type of roadbed construction nor perhaps in condition of maintenance. The internal strains in rolled material cannot be entirely eliminated, but even if this were possible the conditions of their use would introduce strains as soon as placed in track.

Machine for Testing Full-sized Rails

"It follows, therefore, that just as soon as we find what the rail has to stand under present average conditions of service and maintenance, we should try to develop a rail that will stand these strains as long as possible. As a means to that end the Bethlehem Steel Co. will build a machine in the near future that will test full-sized rails as to their ability to withstand these stresses, which by previous determination we have found to exist in rails under normal service conditions. From a long series of tests of this sort we should obtain valuable information as to the effect of different sections, different composition, and perhaps different methods in the manufacture of rails.

"Tests of this character, however, take a long time, and in the meantime we are faced with this type of failure constantly on the increase. In what practical way can we cut this down or at least lessen the chances of this type of failure appearing so soon after rails are put into service?

"A careful survey of all the rails that have failed from transverse fissure brings out the fact that, while they have been found in all types of rails (as is so well summarized in the closing paragraph of Mr. Howard's paper), the large majority have occurred in rails possessing extreme hardness. This should not be confused with carbon content, but is better indicated by the Brinell ball or similar test. Rails that are extremely hard have developed transverse fissure earlier in their life and in greater numbers than rails which do not have this extreme hardness.

"Obviously, it is incumbent upon consumers of rails to stop placing in tracks rails that by all known tests are shown to be extremely hard. While the responsibility of the safety of the tracks rests upon the railroads, the rail manufacturers morally share this respon-

sibility and should refuse to produce rails that are so close to the limit of brittleness.

"Some engineers have insisted on the use of extremely high carbon rails, having in mind a few trial lots made with very high carbon content, but extremely low contents of other hardening elements, which gave good results in service. We must remember, however, that in extremely high carbon rail containing the usual percentages of other hardening elements we are close to the limit of brittleness.

Segregation of High Carbon Rails

"At the present time a few of the railroads are segregating the higher carbon rails from the others and placing these at points where the service demands a rail that will give good resistance to abrasion. This is a promising step in the right direction. It is very doubtful if we shall ever entirely eliminate the transverse fissure failures, as their occurrence is merely a matter of time, but we certainly can materially reduce their frequency if we keep our rails to a normal hardness—even if we do sacrifice a little of the resistance to abrasion (which I think is very doubtful)—and develop for each particular type of service condition a grade of steel that will most satisfactorily meet these different conditions."

It was the opinion of J. S. Unger that Mr. Howard's reference to the fatigue of metals under oft-repeated stresses is a subject which has not been given the consideration it merits in the study of rails. He agreed with Mr. Howard that "brittleness under repeated stresses does not constitute evidence of defective or inferior steel. Ductile metals, such as copper or low-carbon steel, can be made to show brittleness under prolonged alternate stresses. Compared with the preceding examples, the average rail of about 0.65 per cent carbon and a tensile strength of over 100,000 lb. per sq. in. is not a particularly ductile material, yet it is used under conditions of repeated alternate stresses. If transverse fissures are the result of the combined influence of such stresses and the cold rolling of the head, is it any wonder rails fail from such fissures, especially when the stresses are close to the fiber stress of the steel?"

Remedies to Prevent Fissures

"The remedies for the prevention of transverse fissures must be apparent to all and must necessarily be one or a combination of the following," said Mr. Unger:

Support the rail so thoroughly that injurious alternate stresses cannot exist.

Decrease the load, or what is the same thing, the alternate stresses, to such a point as to permit of a reasonable factor of safety common to good engineering practice.

Increase the section of the rail until the safe limit of endurance is greater than the stresses to which the rail will be subjected.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., expressed the opinion that fissures in rails are a result of the condition of the steel in the furnace—that they depend on the quality of the steel. The cure is obvious, he believed. Steel well made, he contended, would stand up better in drop tests; the proper heating of the ingot near the recalcence point was also essential and a retardation of the rate of cooling after rolling would have a beneficial effect.

Dr. P. H. Dudley, New York Central Railroad, New York, read a long discussion, giving his road's experiences with certain rail failures, due to interior transverse fissures.

So much time was consumed in the presentation of the two papers on erosion and rail fissures that the two other papers on the program dealing with blast furnace and other slags were postponed.

The Structure of Steel Welds

The session on Wednesday morning was devoted to the metallography of steel and was presided over by E. Gybbon Spilsbury, consulting engineer, New York. One of the most interesting papers of this session was "Some Structures in Steel Fusion Welds," by S. W. Mil-

ler, Rochester Welding Works, Rochester, N. Y. An abstract of this paper will appear in a later issue of THE IRON AGE. Mr. Miller has presented in this paper the results of numerous investigations of the structure resulting from oxy-acetylene and electric-arc welds. The author, who presented the paper in abstract himself, stated that the peculiar lines found in welds were probably cementite, but that there were less of these in oxy-acetylene welds than in electric-arc welds. The paper abounds in photomicrographs and in valuable data on the subject, though the conclusions reached were regarded as wrong by some.

Henry W. Boylston, Sauveur & Boylston, Cambridge, Mass., expressed a sense of indebtedness to Mr. Miller for the material he had gathered, but he felt he could not agree with the author that the needle-like structure which was formed was cementite and that there were several discrepancies in this proof.

W. E. Ruder, research department, General Electric Co., Schenectady, N. Y., stated that his first impression on looking at the author's structures was that the lines represented nitride of iron, but he believed that it would be difficult to form nitride of iron from nitrogen and iron, while it would be easy from ammonia and iron.

Zay Jeffries also testified to his appreciation of Mr. Miller's work, but was convinced, as a result of his own personal study of various welds, that the structures referred to by Mr. Miller were not cementite, but were undoubtedly martensite. All the conditions were such as to prove this. Mr. Jeffries went into an elaborate explanation of the reasons for his statement, showing why such structures could not be cementite. Nor could they be nitride of iron, he judged, because why should nitride form in the short time it takes to make a weld when oxygen is present in such abundance?

Tempering Gun Barrel Steel

"The Time Effect in Tempering Steel," by A. E. Bellis, metallurgist, Springfield Armory, Springfield, Mass., was presented by title in the author's absence. It is printed nearly in full in this issue of THE IRON AGE.

H. M. Boylston regretted the absence of the author, to whom he desired to present certain questions. He, however, stated that the experiments given in the paper were very valuable because they represent a long experience. Regarding the high phosphorus and sulphur in the steel used by Mr. Bellis, Mr. Boylston stated that he believed he had data which would prove that steel with sulphur and phosphorus as high as this would prove unsafe for rifle barrels. He would have liked to have asked Mr. Bellis why he advocated high manganese—was it because the sulphur was high in the steel, as well as the fact that the elastic limit was thus increased?

Dr. John A. Mathews, president Halcomb Steel Co., Syracuse, N. Y., stated that earlier papers had shown that there was nothing to be gained as to time in tempering carbon steels, but as to alloy steels this factor is very important. In spring steels there is probably no producer now who does not perform the drawing at a carefully regulated temperature.

Henry D. Hibbard drew attention to the fact that the main point in Mr. Bellis' paper was the advantage gained in the machining qualities of the steel. The paper also applied only to rifle barrels or to small masses of steel. For steel for structural purposes it is evident short heating is adequate because of the higher elastic limit, as shown by the tables in the paper.

Copper in Steel

Prof. Carl R. Hayward, Massachusetts Institute of Technology, Boston, was unable to reach the city in time to present his paper, "Effect of the Presence of a Small Amount of Copper in Medium Carbon Steel." An abstract was published in THE IRON AGE, Feb. 14, 1918.

F. N. Speller, metallurgical engineer, National Tube Co., Pittsburgh, Pa., stated that Professor Hayward had demonstrated that copper in steel over 0.75 per cent is a benefit. It was his own opinion that copper is not an enemy. He had found it possible to weld steel containing up to 0.75 per cent and 1 per cent copper. He

believed the maximum limitation of 0.05 per cent copper in some specifications entirely unjust.

Dr. John A. Mathews called for the removal of certain copper limitations in some specifications in the light of our modern knowledge. In his own experience he had made some steel for the Panama Canal, which contained 0.10 per cent copper, while the specifications had a maximum limit of 0.05 per cent, and which was rejected for this reason. Swedish irons, said Dr. Mathews, contain from traces to 0.20 per cent copper and no one has ever been afraid of them.

Edwin F. Cone, associate editor THE IRON AGE, called attention to the fact that some years ago makers of acid open-hearth steel castings were afraid to use copper-bearing low-phosphorus pig iron because they believed it was injurious to their product. Such iron contained about 0.25 per cent copper. Later, when compelled to use some copper-bearing iron, they mixed an 0.25 to 0.50 per cent copper iron with a non-copper iron, though as to sulphur and phosphorus the copper iron was the better. Very recently it had come to the attention of the speaker that one of the largest makers in the United States of converter steel castings was using a copper-bearing pig iron with the result that his steel contained from 0.75 to 1 per cent copper. This producer was able to show physical results which he claimed excelled by over 10 per cent the results obtained when he was using a non-bearing copper iron.

The subject of grain size was again brought before the institute by a paper, "Grain Size Inheritance in Iron and Carbon Steel," by Zay Jeffries. It was presented in abstract and discussed by the author. The paper includes a brief discussion of Professor Howe's paper on "The Supposed Reversal of Inheritance of Ferrite Grain Size from That of Austenite," *Bulletin*, American Institute of Mining Engineers, September, 1917, and the general subject of grain refining in steel and iron.

Employment Problems

The papers read at the session of employment problems produced a large amount of discussion of a practical character. Herbert M. Wilson, director of inspection and safety of The Associated Companies, in a paper on mine labor and accidents, presented statistics showing that 40 per cent of the accidents in mines were chargeable to the human element, carelessness, negligence, etc. He held that the class of labor employed was not responsible for this condition, but that one of the prime causes was industrial unrest. Personal work has a direct relation to accident prevention, but more than this is needed. Welfare work, so-called, is much more valuable, but the greatest improvement can be effected by improving the living, housing, moral and physical condition of the employees. Accidents are fewest among contented, happy and healthy employees.

Other speakers in the main agreed with Mr. Wilson. One considered that 40 was too low a percentage to ascribe to accidents due to the human element, and thought that 66 per cent, or even more, would be nearer the correct figure. B. F. Tilson of the New Jersey Zinc Co. presented a chart showing the results of accident prevention work over a period of years by his company. In 1905 the accidents were 3.34 per 1000 employees and in 1916 they had fallen to 0.62. Plotting the accidents by years, it was found that they followed very closely a hyperbolic curve whose equation is $y = 3.56$

— The practical value of such a curve is that it $x^{1.065}$ shows the degree of improvement that may reasonably be expected from year to year in safety work. The methods used, the speaker stated, were a consistent education campaign and the payment of bonuses to shift bosses for low accident records. The bosses were required to instruct the men, under them in safety methods. The bonuses were paid monthly, and semi-annual and annual bonuses were also paid, based on the monthly bonuses earned.

E. E. Bach, sociological director of the Ellsworth Collieries Co., gave statistics as to the time of greatest frequency of accidents. August was the worst month

and February next. More accidents occurred on Tuesday than on any other day, while Monday had the next worst record. From 10 to 11 in the morning and 2 to 3 in the afternoon were the worst periods of the day. Investigations were under way to discover the reasons for these facts.

It was the consensus of opinion that the percentage of accidents was highest among the experienced workmen. These men are apt to be more careless and to resent instruction.

The Cost of Illness in Industry

The money value of good health in workmen was ably presented by Dr. Thomas Darlington in a resumé of his paper, "Illness in Industry—Its Cost and Prevention." He outlined briefly the changes that took place in the body as the result of effort, and showed how food supplied the energy for this effort. The effect on the utilization of food energy of imperfect physical condition and bad hygiene was traced, and then the relation of these conditions to productivity was shown. For instance, an experiment was described showing how the lack of toilet facilities, forcing workmen to retain waste in the body, so reduced the effort possible that if a normal man were rated at \$2.50 per day these were worth but 90 cents. The question of personal hygiene was gone into at great length, and the following items were enumerated as those to which the workman should pay close attention: Regulation of meals, as to amount, character and mastication; amount and character of drink; hours of rest and sleep; ventilation of rooms; personal cleanliness; washing of hands before meals; brushing of teeth; daily washing of feet; proper fitting of shoes; kind and amount of clothing; care of eyes, ears and nose; regularity of bowels; regularity of work; cultivation of cheerfulness. The condition of the mind has much to do with the secretions of the body, and these in turn affect the productive capacity of the man. The importance of good home surroundings and good health, as affecting the mind, is quite evident. Poor teeth are a prolific cause of inefficiency and indirectly a cause of pneumonia. Frequent brushing of the teeth removes pneumonia bacteria which are present in the mouth, so that the preservation of the teeth also prevents pneumonia. It was stated that in the aggregate bad teeth cause more harm than alcohol. Summing up, Dr. Darlington showed that every dollar expended in the prevention of illness and the promotion of personal hygiene returned handsome dividends in increased productivity and a stable working force.

Dr. E. E. Southard discussed Dr. Darlington's paper from the standpoint of the psychopathic employee. He divided abnormally minded workmen as feeble minded, moody and peculiar, and outlined the character of work for which each was fitted. Certain classes of work can be better done by men of one of these three classes than by any other men, and industry will have made a large advance when it systematically discovers these individuals and directs their energies in the proper channels. He cited the work that had already been done in the army as an instance of the possibilities of this line of action.

The Reduction of Labor Turnover

Labor turnover is a pressing problem at the present time, and the paper on this subject by Thomas T. Read of the New Jersey Zinc Co. was the occasion of much comment. After briefly describing the organization of an employment department, whose effect is to reduce the turnover, Mr. Read summed up the situation as follows:

1. The cost of labor turnover in industry is large enough to justify extensive measures to reduce it.
2. Centralized hiring is the most effective means to reduce labor turnover.
3. Hiring by the foreman is a relic of outgrown industrial conditions.
4. Centralized hiring does not impair the authority of the foreman; he hires his men from the employment office and discharges them back to it instead of to the street.
5. Relieving the foreman of the labor of looking for men gives him more time for the performance of his proper duties and improves his efficiency.

6. The employment manager, being a specialist, is able to devote special skill and knowledge to the art of selling employment in his organization to the workman.

7. The employment manager is able to give the foreign workman the special attention he requires.

8. The employment manager also tends to restore the former conditions of direct relations between employer and employee and hence brings about a better esprit de corps in the organization.

9. The methods used by employment managers are much along the same lines in every industry, as human nature is much the same everywhere.

10. The results that have been attained through centralized employment speak for themselves.

11. The employment manager must be given sufficient rank, otherwise he cannot work effectively. A high type of man is required and the saving he is able to make justifies the cost of securing such a man.

The comment on this subject, in the main, dealt with the value of the employment department. It was also brought out that welfare work had a large share in reducing turnover, inasmuch as it made for contented workmen who were loath to give up jobs where they had comfortable surroundings and good homes for others where these conditions did not exist, even though the wages were higher. In this connection it was brought out that insufficient or improper housing always caused a high turnover. In the so-called war industries the turnover has ranged from 10 to 50 per cent per month, and studies by the United States Department of Labor had shown the causes to be bad housing, lack of standardization of wages and the hiring of men unsuited to the work. In the shipbuilding industry in particular these conditions were acute. The last named trouble was now being met by a training school at Newport News where instructors were being fitted to go out to the shipyards and train workmen in the performance of a single job.

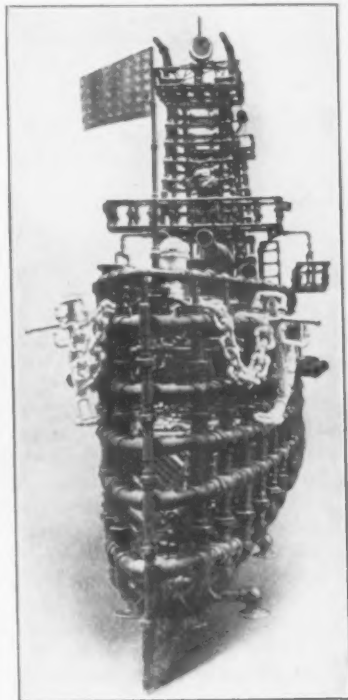
The Foreign Workman

Of absorbing interest was the talk by Prince Hrebilianovich of Serbia on the viewpoint of the foreign workman. Prior to the war foreign labor could be divided into two classes: those from Western Europe, comprising British, Irish, Scandinavian, French, Belgian and German workmen; and those from Eastern Europe, comprising the Lithuanians, Poles, Finns, Russians, the Slavs of Austria-Hungary and men from the Balkan Peninsula. Those of the first class, as a rule, came to America to make their home here. They were highly individualistic and spent their earnings here on a high standard of living. The Eastern Europeans, as a rule, were accustomed to mass action and community living. All action at home, in an industrial sense, was taken through their unions. Their principal object in coming to America was to make money and return home to live in comfort thereafter. They were attracted to the United States by the most shameful kind of lying advertisements published by the steamship companies, which represented America as a place where gold was literally to be picked up in the streets. Their disillusionment on landing was prompt, and the treatment received at the hands of unscrupulous boarding house keepers and employment agencies quickly embittered them against the country. As a rule they were exploited and robbed before being put to work, this being rendered easy by their ignorance of the language and customs of the country. Their object being to save money, they adopted a low standard of living, much below that which they had at home.

At work, their principal grievance lies against the foreman over them. This grievance is based on racial and religious grounds. The Eastern European is generally unskilled and takes the laborer's job. He is, as a rule, put under an Irish foreman, whom he intensely dislikes, and who usually is a Roman Catholic. As a large majority of the men have been influenced to emigrate for religious reasons, its injection into their work through the medium of the foreman supplies an additional source of discontent. As a result of the failure of all their ideals regarding America, they look with suspicion and distrust on all advances made toward them to persuade them to become Americanized and American citizens. The East Youngstown riots of 1916 were stated to be largely an acute aggravation of

grievances against the foremen. Prince Hrebilianovich made an eloquent plea for more liberal treatment of the foreign worker.

Pipe fittings, valves, specialties, etc., to the number of 6669 separate pieces entered into the construction of a model of the superdreadnaught New York now on exhibition in the rooms of the Crane Co., 23 West Forty-fourth Street, New York. An employee in the Bridgeport plant of the company is responsible for the design and construction of the model, which is complete to small details. The ordinary working parts of the battleship are movable. The action of the various parts of the battleship is automatic and is controlled by a push button switch. The ship is wired throughout, the wires running in conduit, and when the button controlling the action is pressed the propeller is revolved by an electric motor, lights flash, the guns roar, the wireless apparatus becomes active and a beam of light is thrown by the searchlight. The model measures 186 in. in length, is 34 in. broad, and the total height from the keel to the mast head is 102 in. The net weight is 3308 lb.



A Total of 6669 Separate Pieces of Pipe and Fittings Entered into the Construction of a Model of an American Superdreadnaught

Exemptions to factories using power delivered from water-power companies do not seem to have been at all general in this recent series of Monday shutdowns for fuel conservation. For example, the Jones & Lamson Machine Co., Springfield, Vt., which depends almost wholly on water power, was unable to get exemption in spite of the fact that it is working on priority A-1 Government material. The Greenfield Tap & Die Corporation, Greenfield, Mass., while it uses power from the New England Power Co., had a special exemption from Washington to do some special Government work. It appears that this particular power company was instructed to furnish no power on Mondays made in part from steam to any plant not exempted, and particularly in this time of the year the power company has to use coal.

The Bridge & Beach Mfg. Co., St. Louis, manufacturer of stoves, has acquired a 10-acre site in the belt-line district surrounding St. Louis, and will erect and equip an entirely new plant, to which it will remove from its present site on the river front in the center of the city.

The Cleveland Metal Products Co. of Cleveland has acquired a location at St. Louis, where it will establish warehouses and also install some equipment in connection with its business of manufacturing and distributing oil stoves, aluminum ware, and other metal ware.

Electrolytic copper, as well as nickel and cobalt, are to be produced by a new Swedish company at Västerås. The founders of the company include some of the most important financial enterprises in Sweden.

MANGANESE STEEL RAILS

A Comparison with Open-Hearth as to Wearing Qualities on American Roads

MANGANESE steel rails have been in service on seven American railroads under observation as to the results secured. M. H. Wickhorst, engineer of tests of the rail committees of the American Railway Engineering Association, Chicago, has prepared a bulletin, No. 199, of that association which gives results, based on reports which the seven roads submitted, giving in detail the curvature and grades and the approximate density of traffic to which the test rails were subjected. An abstract taken from *Railway Age* of two of the reports with the conclusions based on the seven reports is as follows:

Tests on the Lackawanna

In the fall of 1912, 500 tons of 101-lb. rolled manganese rail was secured for use on some of the sharp curves of the eastbound track of the Delaware, Lackawanna & Western on a 1½ per cent grade down the Pocono Mountain. After the manganese rail had been in service for about two years, the low rail on some of the sharpest curves showed signs of flowing. This flowing was not by the formation of a lip, as is usually the case with Bessemer or open-hearth rail, but the head of the low rail dished slightly and the entire head seemed to move both ways from the center. With a view of getting the full life out of this rail, we decided to remove the low rail from the curves in question and lay it on the high side of other curves, laying frictionless rail on the low side.

For convenient study, the results of the several tests showing the abrasion of the high rail per million tons of traffic are given below:

High Rails		Square Inch Abrasion per Million Tons
Curve	Kind	
6°	Bethlehem open-hearth	0.0230
6°	Lackawanna Bessemer F. T.	0.0283
6°	Lackawanna open-hearth Spec. Prem.	0.0274
6°	Bethlehem open-hearth Spec. Prem.	0.0200
6°	Illinois manganese	0.0035
6°	Illinois manganese	0.0035
6°	Lackawanna open-hearth Spec. Prem.	0.0222
6°	Illinois manganese	0.0034
7°	Lackawanna Bessemer	0.0718
7°	Lackawanna Bessemer	0.0583
7°	Passaic manganese	0.0115
7°	Bethlehem open-hearth	0.0275

Tests on the Pennsylvania

In April, 1912, about 41 tons (0.27 track miles) of 100-lb. P. S. Manard rails were laid in the eastward freight track on the Horseshoe curve, and open-hearth rail was laid simultaneously, adjoining it, for comparison. The Manard rail cost \$94 per ton. In September, 1912, the open-hearth was replaced with new open-hearth, this latter rail remaining in track until Jan. 7, 1913. The open-hearth rail was again renewed on June 20, 1913, and both open-hearth and Manard were removed Oct. 15, 1913, the life of the Manard being 17½ months, or four times that of the open-hearth.

The figures below give the average abrasion of each kind of rail:

Date of Measurement	Manard		Open-Hearth	
	Square Inches	Per Cent of Head Abraded	Square Inches	Per Cent of Head Abraded
October, 1912	0.08	1.9	0.52	12.4
February, 1913	0.47	11.2	1.25	29.8
June, 1913	0.63	15.0	2.11	50.1
October, 1913	0.81	19.2	3.11	74.0

There were three failures of the Manard rail out of a total of 84 rails laid, two consisting of transverse fractures through the head and about two-thirds of the web and one by split head.

On Jan. 26, 1914, about 0.27 track miles of Manard rail was laid in the eastward freight track on the Horseshoe curve in comparison with ordinary open-

hearth rail. It was removed Nov. 9, 1915, the abrasion being as follows:

Abrasion	Manard	Open-Hearth
Total area—square inches	0.74	4.13
Per year of service	0.42	2.35
Per ten million tons of traffic	0.07	0.41

On the Middle division, in 1914, 0.40 track miles of Manard rail was laid, as follows:

Date	Miles	Track	Location	Curve
Jan. 14	0.16	Ewd. Pass.	W. of Barree	6°
Jan. 26	0.19	Ewd. Pass. & Frt.	E. of Tyrone Forge	6°
May 1	0.05	Ewd. Pass. & Frt.	W. of Shoenberger	6°

This rail is still in track and the stretches west of Barree and east of Tyrone Forge now show wear as follows:

Location	Deg. of Curve	Per Cent of Head Abraded	Service to Date	Life of Ordinary Rail
Barree	6°	8.44	33 mo.	14 mo.
Tyrone Forge	6°	10.39	33 mo.	18 mo.

Of the 0.94 track miles of Manard rail in track there have been 40 failures, of which 28 were transverse fractures through the head and a portion of the web, 6 were split head and 6 split web. In no case was the rail broken through. Forty failures in 0.94 track miles in average life of 3½ years amount to 1216 failures per year per 100 miles of track, as compared with an average of 27 failures for all rail on the Pennsylvania on the same basis.

A comparison of failures per 100 track miles of Manard rail with those of ordinary open-hearth 1913 100-lb. P. S. rails shows the following:

	Failures per 100 Track Miles				Position in Ingot			
	Head	Web	Base	Broken	A	B	L/3	*Total
Manard	639	639	..	2977	2127	1488	74	4255
Ordinary O.-H.	31	27	2	28	23	16	12	88

*Failures in lower positions divided by 3 to show approximate number in each position.

The annual cost per ton of open-hearth rail at \$30, lasting one year, is \$28, and Manard at \$94, lasting four years, is \$27. It would therefore be economical to use Manard rail on sharp curves under heavy traffic where ordinary open-hearth rail lasts one year or less, but not elsewhere. In this comparison failures are not taken into account. If they are considered, the cost of the Manard rail per ton per year would be increased about \$3, and with such a failure rate it would be economical only at locations where ordinary open-hearth wears out in 8 months.

Conclusions

The following are probably the conclusions that may be drawn from the various tests:

Manganese steel rails abrade much slower than Bessemer or open-hearth steel rails on sharp curves. On curves of 8 or 9 deg. the abrasion of the high rail per million tons of traffic may be taken very roughly as follows: Manganese, 0.004 sq. in.; open-hearth, 0.012 sq. in.; Bessemer, 0.20 sq. in. In other words, the abrasion of open-hearth rails is about three times that of the manganese rails, and the abrasion of the Bessemer rails is about five times. The results, however, vary considerably and are probably dependent upon the nature of the rolling equipment as well as the tonnage. We also have no information as to relation between the abrasion and degree of curvature.

Manganese steel rails become distorted by spreading and drooping of the head more easily than open-hearth rails, and apparently, also, than Bessemer rails, explained presumably by the low elastic limit of manganese steel.

The failures or breakages of manganese rail were extremely high and seemed to consist mostly of transverse cracks in the head, starting from the surface, resulting finally in pieces of the head breaking out. The manufacturers explain these failures as due to faulty manipulation in the early manufacture of manganese rails, which has since been remedied. Imme-

diately after rolling, while still very hot, it is necessary to quench the rails in water, which operation was not at first handled in an entirely satisfactory manner.

Hydraulic Press for Testing Shells

A hydraulic press for the internal testing of shells has been brought out by the Metalwood Mfg. Co., Detroit. The press is operated preferably by weighted accumulator line pressure, as local conditions may require. It is made in three sizes, one for testing 3-in. and 75-mm. shells, one for 4.7 and 5 in. sizes, and the third with a capacity for testing 6-in. and 155-mm. shells.

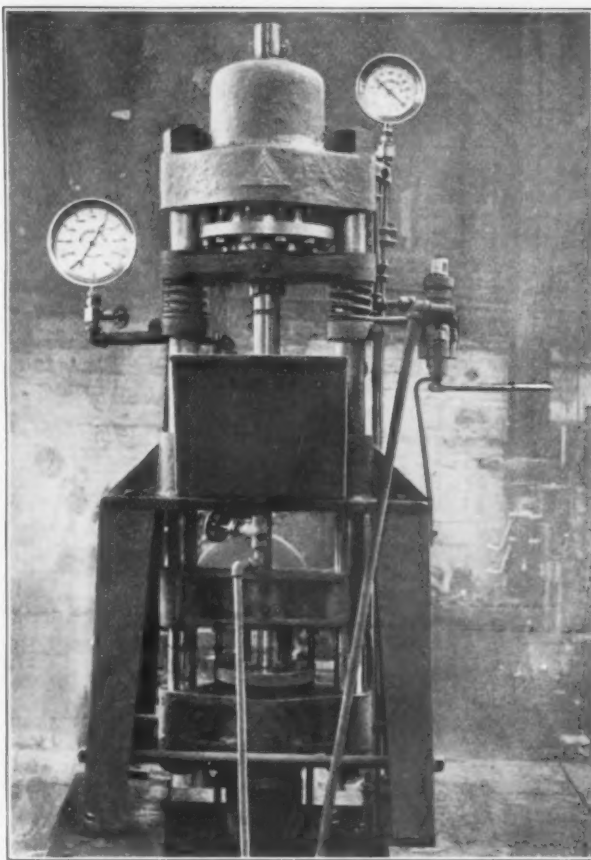
The object of hydrostatic test is to develop any hidden defects in the shell not apparent to the naked eye, and not made known by the application of the ringing test or by any other means. Physical tests by internal hydrostatic pressure prescribed under the U. S. Ordnance Department specifications are made primarily for and against the higher stress in yield limit of the heat-treated shell, and to show forging defects in lamination and piping through the base. The press is designed to facilitate the handling of a shell by immersed filling and emptying the shell within the machine, thus eliminating prefilling and emptying from outside the machine and the wetting of floors and workmen. All water is used and returned directly within the tank that is mounted on the machine. The shell is filled by immersion within the tank, inverted and placed under seal, due to atmospheric pressure, with the base in an upright position. An open horseshoe shaped clamping head permits observation of the base during the test.

The press provides direct intensified pressure from an input accumulator reserve line at 1500 lb. pressure per sq. in. The machine consists of an intensifier cylinder of proper proportions and a pullback cylinder under constant line pressure to build up the required internal test pressure within the shell and resistance head. The cylinder exerts an excess over pressure between the shell nose and resistance head with a fluid tight joint.

The working cylinders are alloy steel castings cast integral, with polished bores and tested to 3000 lb. per sq. in. The pullback cylinder is a steel casting; the cross-head carrying intensified shell plunger, a semi-steel casting with bronze bearings; the cross sill, a steel casting; the lower and upper main rams are of 40 per cent semi-steel, ground and polished; and the intensifier plunger is hardened and ground tool steel. The main packings consist of boxes and glands suitable for square hemp or hydraulic packing. The resistance head is provided with packings suitable for fluid tight pressures of 18,500 lb. per sq. in. for the 75-mm. machine, and 13,500 lb. per sq. in. for the 155-mm. machine. The sealing nose and shell holder are of hardened tool steel. Pullback springs are provided for the quick return of the clamp or sealing cylinder. The press is piped for field connections. A quick-operating valve is provided for controlling the operation of the intensifier and the sealing clamp cylinder. A hydraulic gage graduated to 30,000 lb. is furnished for recording the line pressure applied to the shell.

The 75-mm. press is designed to deliver a minimum intensified pressure within the shell chamber of 18,500 lb. per sq. in. The sealing pressure exerted by the upper clamp cylinder permits 50 per cent in excess of the opposing intensified pressure. The displacement of water due to one operating stroke is 0.6 gal. With the 15-sec. duration test required by the Ordnance Department specifications the capacity of this press is given at over 2 shells per min., or an average of 1200 to 1500 shells per 10 hr. The 155-mm. shell press is designed to deliver a maximum intensified pressure of 13,500 lb. per sq. in. Its displacement of water in one operating stroke is 1.4 gal. Its capacity is given as over 1 shell per min., or an average of 600 to 800 for 10 hr.

It is pointed out that in the operation of the press the trapping of air within the shell is avoided as all parts of the high-pressure head remain under water, and all displacement due to the intensifying ram takes



In a New Hydraulic Shell Testing Press Prefilling and Emptying from Outside the Machine Are Eliminated, the Shell being Filled by Immersion within the Tank, Inverted and Placed with the Base in an Upright Position under a Seal due to Atmospheric Pressure

place beneath the water column and below atmospheric pressure. When the shell is placed with the nose downward, water sweat due to porosity will not be confused with a leakage due to a faulty seal that might occur when the nose is clamped in an upright position. It is stated that the clamping pressure of the machine has been carefully calculated to avoid any undue column stress in the shell structure where augmented stress is effective with the pressure within the shell chamber.

The 3-in. and 75-mm. shells are handled manually, as their average weight of 10 lb. is within the capacity of the operator. The 6-in. and 155-mm. shells are conveyed by a light differential hoist and monorail carriage. The filling and emptying of water within the shell is accomplished by a segment clamp trunnion provided with an offset hand fulcrum, for placing the shell in the sealing seat. The standard equipment consists of a complete plant installed where no hydraulic power pressure is available. This consists of the internal test press, triplex single-acting pump, multiple weight yoke type accumulator and positive control by-pass valve to release the excess pump delivery.

The annual exhibit of evening work of Pratt Institute, Brooklyn, N. Y., will be held March 7. The school of science and technology of the institute provides instruction in industrial electricity, technical chemistry, machine design, internal combustion engine work, machine work and tool making, forge work and the like. There are now in the evening courses some 1300 men.

The third annual session of the World's Salesmanship Congress will be held in Detroit April 24-27 inclusive. The date is two months earlier than usual, and among other objects aimed at is the counteracting of the propaganda about non-essential businesses.

The Tennessee Manganese Co., Knoxville, Tenn., has increased its capital stock from \$20,000 to \$200,000 in order to increase its operations at Sevierville, Tenn.

RIFLES AND ARTILLERY

Rapid Progress Being Made at Government and Private Plants

WASHINGTON, Feb. 26.—Reports received by the Ordnance Bureau of the War Department during the past week indicate the most gratifying progress on the part of private manufacturers of rifles and both light and heavy artillery. Deliveries of modified Enfield rifles are now being made at the rate of 10,000 per day, or about 250,000 per month, a rate so far in excess of the actual requirements of the army as to severely test the storage facilities of the Ordnance Bureau. Machine guns are also being produced in excess of schedule requirements, while field guns ranging from 3-in. to 9.5-in. howitzers are in an advanced stage and deliveries thereof will begin at an early date. Taken as a whole, these progress reports constitute a very complete vindication of the bureau's policy with respect to supplies of ordnance material which will be ready long before it is actually needed by the American fighting forces.

The modified Enfield rifles are now being supplied by the Winchester and the two Remington companies at a higher rate of delivery than was ever attained under the original British contracts, when a maximum of 8000 a day was reached, but without the close attention to detail necessary to standardize the parts of the weapon in order to render them interchangeable to a satisfactory degree. The Ordnance Bureau has been subjected to a great deal of criticism for not having contracted for the original Enfield model using British ammunition with parts interchangeable only to the extent of about 20 per cent. While it is true that if this had been done larger deliveries of rifles would have been made, but the guns would have been open to several serious objections aside from low percentage of interchangeability.

Advantages of New Model

In having the original model modified to take Springfield ammunition, the bureau has substituted the rimless for the rim cartridge and has thus done away with the danger of jamming, which makes the British rifle undesirable, and at the same time has made it practicable to use the Springfield cartridge, which has much higher muzzle velocity and penetrating power. In addition, the change in ammunition standardizes the infantry rifle with the machine guns now being manufactured, a highly important consideration when it is remembered that these weapons will be used by the same men in the trenches. The percentage of interchangeability secured in the modified Enfields now being delivered by the three contracting companies is so high that all parts likely to be lost or damaged in use can be replaced either by the soldiers themselves or by armorers in the field without any equipment except a few simple hand tools. This makes it unnecessary to have repair-shop bases in the immediate vicinity of the advanced positions of the American troops, and also renders it practicable to operate these shops as single units. This could not be done with the English guns, which require three separate sets of non-interchangeable spare parts.

Best Small Arm Known

The policy of the Ordnance Bureau, therefore, has resulted in equipping the American army already in France with Springfields, admittedly the best small arm known to modern military science, while all troops to be sent abroad hereafter will carry modified Lee-Enfields shooting Springfield ammunition, functioning better and shooting harder than any other known weapon except the Springfield. The bureau has already accumulated a reserve of more than 100,000 of the new rifles, and, as the present rate of manufacture is sufficient to equip 14 army divisions of 18,000 men each per month, it is altogether probable that this reserve will steadily increase, as current production

has already far outstripped the troop transport facilities now available.

The Ordnance Bureau gives credit unreservedly to the three concerns manufacturing the modified Enfield rifles for the splendid co-operation afforded and for the great skill shown in steadily increasing the percentage of interchangeability of these rifles while at the same time speeding up production. The success of the manufacturers in this respect has eliminated all grounds for one of the chief criticisms to which the Ordnance Bureau has been subjected, namely that increased interchangeability was obtained only by the practical suspension of production for a period not justified by the higher efficiency secured.

Work at Private Plants

The reports from the 20 large private manufacturing plants co-operating with the Ordnance Bureau in the manufacture of field artillery are quite as gratifying to the experts of the department as the results in the manufacture of rifles, but, because of the magnitude of the work and its inherent technical difficulties, it is not yet possible to make a demonstration so appealing to the layman. Nevertheless, the progress made is decidedly in advance of expectations, and initial deliveries will probably be ahead of time. The contracts placed with the 20 firms mentioned call for 16,000 heavy guns to cost approximately \$250,000,000. More than \$30,000,000 have been spent in equipping 12 of the 20 establishments, six of which are being devoted to making forgings while the other six have been fitted up for machining and assembling. About \$5,000,000 has been spent for new buildings and \$25,000,000 for machine tools.

Astonishing progress on the expanded program of the Ordnance Bureau has been made within the past six months. Serious difficulties have been encountered in procuring the necessary forgings, because of the transportation congestion and fuel shortage. Some trouble has also been experienced in obtaining labor at some of the plants, in which, in their enlarged dimensions, are not ideally located with reference to the labor market. These obstacles have all been overcome, however, and the supply of forgings is being steadily increased.

In addition to the work on heavy artillery now being rushed in the shops of private manufacturers, the War Department is completing the enlargement of the arsenals at Watervliet, N. Y., and Watertown, Mass., and expects to obtain a very large output from these establishments, and will also have the co-operation of the gun factory at the Washington Navy Yard, as the navy is well supplied with heavy artillery and has already accumulated a substantial reserve.

Metal Trades Convention

The National Metal Trades Association will hold its next convention at the Hotel Astor, New York, on April 22 to 25 inclusive. The convention proper is arranged for morning and afternoon sessions on April 24 and 25. As usual, there will be a banquet on Wednesday evening, and the earlier days of the convention will be given up to the meetings of the executive committee, the council and the so-called alumni dinner.

A new publication of the Bureau of Standards, Technologic Paper No. 103, entitled "Typical Cases of the Deterioration of Muntz Metal (60:40 Brass) by Selective Corrosion," reports the study of selective corrosion of Muntz metal, a material having a variety of industrial uses. The selective corrosion is illustrated by four types, including tubings, sheets and forgings. The metal becomes red in color, very weak, and brittle by this type of corrosion. The condition favorable to such corrosion is the accelerating effect of the closely adhering deposits of chloride resulting from the attack of the metal. Other conditions accelerate the corrosion such as contact with the more electronegative constituents, increase of temperature and service stresses.

SCARCITY OF FLUORSPAR

Cold Weather and Railroad Congestion Hold Back Mining and Shipments

Due to cold weather, snow and ice and labor shortage at the mines and difficulties in transportation, a real shortage of fluorspar has developed which is embarrassing steelmakers. In basic open-hearth practice this mineral has become indispensable for fluxing. Very little is now obtainable for prompt delivery and those who have contracts are not getting a full supply. A few weeks ago an Eastern ordnance plant was on the verge of shutting down because it ran out of fluorspar, but a carload was rushed through in time to prevent stoppage of work.

For many years fluorspar received little attention. Steelmakers placed their contracts once a year and, if additional supplies were needed, they were usually obtained easily. Up to 1917 the average price of domestic fluorspar at mines or local shipping points for all localities and all grades ranged from \$5.50 to \$6.50 per net ton. Contracts for delivery during 1917 were placed mostly on the basis of \$7 at mines. When it came time to buy for 1918 steelmakers found that the price had risen to more than triple the old price, contracts having been taken for 1918 at about \$25, f.o.b. mines, while for prompt delivery fluorspar commands \$38 to \$40 a ton at the present time.

During this winter the mining regions, which lie principally in Kentucky and Illinois, have been affected by the severe weather. The mines have partly filled with water and snow, which has frozen. The rivers on which barges carry the mine output to the railroads have been frozen over, making navigation impossible. Labor has been hard to get. Many men would not work at all during the extremely cold weather. On top of these troubles came the railroad tie-up and it became almost impossible to ship fluorspar after it had been mined. These conditions have tended toward the present extremely high prices.

Prior to 1915 the domestic production of fluorspar was less than 50,000 tons annually. Up to 1908 it fluctuated considerably, but in 1909 it began to increase rapidly owing to its more general recognition as a valuable flux in the manufacture of basic open-hearth steel. There was a steady increase in production from 1908 to 1912, but in 1913 and 1914 there were decreases incident to depression in the steel industry. In 1915 and 1916 the production largely increased, owing to the revival of the steel and chemical industries, the output for both these years exceeding all previous records. This country formerly imported fluorspar from England, the largest importations in one year having been in 1911, when 32,764 tons were imported, compared with a domestic production of 87,048 tons. In 1916 domestic production increased to 155,735 tons, while importations declined to 12,323 tons. There are no imports of fluorspar at the present time nor are there any exports.

According to the U. S. Geological Survey, practically all of the fluorspar imported in recent years has been a medium-grade gravel spar, brought over either as ballast or at a very low ocean freight rate and, having been recovered from old mine dumps, it has been sold at a very low figure on the American market. The highest average valuation assigned to such spar in the last six years was \$4.38 per ton in 1916 and the lowest \$2.46 in 1911. These values do not include the duty. A tariff of \$3 a ton was imposed on imported fluorspar in August, 1909, but this was reduced by the Underwood bill to \$1.50 a ton in October, 1913. Gravel spar from England before the war competed with the domestic product at the steel furnaces near the Atlantic seaboard and at times as far west as Pittsburgh.

There are large deposits of fluorspar in several states, including Colorado, New Mexico and New Hampshire. High freight rates prevent much of the Colorado and New Mexico product from being brought to Eastern steel mills, the rate from Colorado to Philadelphia being about triple that from the Rosiclare mines in Kentucky.

Both lump and gravel fluorspar are now used for

fluxing, though formerly most steelmakers preferred the lump. It is said that the Illinois Steel Co. was the first to use the gravel, taking some from a dump pile when its stock of the lump had become unexpectedly exhausted. The effect of the gravel upon the slag was thought to be better than the lump, and basic open-hearth practice has been tending more and more toward the use of the gravel. There are still many steelmakers, however, who prefer to use the lump but have substituted the gravel this winter because it has been the only kind they could obtain.

Heating Crane Cabs Electrically

A number of interesting applications of the electric heater unit made by the Cutler-Hammer Mfg. Co., Milwaukee, have recently been made. This unit, which was illustrated in THE IRON AGE, Jan. 11, 1917, was developed for use in industrial plants in general and particularly in steel mills. The units have a capacity of 500 watts and can be used with either direct or alternating current systems, the standard voltages being 115, 230 or 250. The heat is furnished by a nickel chromium resistor which is inclosed in mica. This in turn is surrounded by a steel jacket, the double installation being relied upon to prevent grounding and eliminate the fire hazard.

At the coke oven plant of the Corrigan-McKinney Co., Cleveland, the units have been installed in the gas valve house, the crane cabs and in the meter house on the charging bridge of the coke oven, the last of these installations being the one illustrated.



Heating the Meter House on the Charging Bridge of a Coke Oven Plant is Accomplished by an Electric Unit

Results with a Rennerfelt Steel Furnace in Sweden

Actual results on the operation of a 1¼-ton Rennerfelt electric steel furnace were recently presented by I. Rennerfelt and H. von Eckermann in a discussion of a paper by Otto Frick on the "Prospects of the Electric Furnace in Sweden." The furnace is located at Ljusne, Sweden, and the data given cover five operating days, Nov. 21 to 25, 1916. According to these men, 12 charges were dealt with, the average net time per charge being 6 hr. and 39 min. The average charge was 1.27 metric tons, of which 19.5 per cent consisted of common Swedish gray pig iron, 6.5 per cent of billet croppings, 64.5 per cent of bar croppings, and 9.5 per cent of scrap. The additions were in 11 of the charges ferromanganese and ferrosilicon, plus in five charges small doses of aluminum, some flux being added (ore = 1.8 per cent average per charge) in every case, plus a small quantity of lime in one case. The average output (including scrap left) was 1.236 metric tons per charge; hence the loss of 2.44 per cent. The scrap left over represented 10.12 per cent of the weight of the ingots and direct castings produced. The consumption of electrodes was 5.1 kg. (11.22 lb.) per metric ton and the energy consumed 1,010 kw.-hr. per metric ton of steel (with 0.21 per cent carbon) produced. The work of the furnace was intermittent, hence the larger consumption of energy. With continuous working and producing steel with a carbon content of 1.20 per cent, Mr. Eckermann thought the average current consumption could be reduced to 800 kw.-hr. per ton of steel produced.

First American-Made Airplanes Shipped

Thousands of Skilled Mechanics Needed
—Secretary of War Baker Tells How
Many Difficulties Have Been Overcome

WASHINGTON, Feb. 26.—In announcing the shipment to France of the first American-made airplanes, Secretary of War Baker gives a graphic picture of the difficulties overcome by American engineers and mechanics in building up in a few short months a new industry devoted to the most important feature of the war work of the American forces. The first shipment of airplanes, which will reach France within a few days, is small, but, now that quantity production has begun, will be followed speedily by large numbers of machines, for reports received from all manufacturers indicate that deliveries will range from 60 to 90 days ahead of schedule both as to engines and planes.

The planes included in the first shipment to France, Secretary Baker says, are equipped with the first Liberty motors for machine production. The final tests of this engine were not made until last September, and since that date a number of plants have been equipped for turning out the motor on a very large scale. Engine production, which began a month ago, is now on a quantity basis, and the peak of production will be reached in a few weeks. Only the 12-cylinder type is being made, as developments abroad have made it wise to concentrate on the high-powered engine instead of the eight-cylinder. An airplane equipped with a Liberty motor in a recent test surpassed all records for speed and climbing for planes of that type.

Results After Three Years

These statements should not be exaggerated but should be considered in the light of the following facts: After three years of warfare, the total number of planes able to take the air at any one time on either side of the western front has not been over 2500. This, combined with the fact that 46 men are required on the ground for every plane in the air, gives a truer perspective of the European aviation situation than is commonly possessed.

At the outbreak of war, the first step, both in sequence and importance, was to build up an industry to rush out the training planes needed for the prospective aviators who were immediately on hand. The ultimate goal, however, was the construction of a large fleet of battle planes. The industry was rudimentary, with only one company on an appreciable production basis and a dozen small experimental companies. The metal work was mostly done by hand, each machine built as a separate unit, and little attempt made to manufacture from dies, jigs or gages. The estimates of the total value of the industry vary from \$2,000,000 to \$10,000,000 and of employees from 500 to 10,000. The government was practically the only purchaser, having ordered 366 planes the year before the war, of which only 66 were actually delivered.

Engineering Problems

The engineering problems, Secretary Baker continues, were even more complex. Europe, at war, with the best engineers of each country pitted against each other in a struggle which knew no close, had worked out the most ingenious developments in the light of actual fighting experience. Information reaching here was generally fragmentary and always late. As a result, when war came the United States had practically no airplane engineering staff and no modern fighting planes.

Construction of planes presented a much more complex problem than that of engines, which had been developed and produced here for other purposes on a colossal scale. The extreme refinement of their manufacture, requiring 23,000 screws in a single fighter,

or 700 pieces of wood in a single wing, necessitated the most expert workmanship and balance to secure the essential combination of lightness with strength, and seemed to militate against quantity production.

Getting Information

The first step was to secure information from Europe. A commission was early sent across and rushed back the last-minute details, upon the strength of which a large number of fighting planes of a certain type were ordered. The raw materials were very largely in hand and the drawings within several days of completion when another cable said that this type had been superseded and should not be built. Nearly a month was thus lost.

Drawings then came for another type. They had just been redrawn for American manufacture and the die makers put to work when a second and different set arrived. The work done had to be cast aside and the process begun over again. Just as it was nearing completion, still a third set of drawings arrived, and a third start was necessary. The unavoidable loss of time was preferred to turning out a design known at the outset to be out of date.

The effect of separation from the battlefields by 3000 miles is further shown in that anywhere from 17 days to 11 weeks has been required to secure various important samples from abroad. Another three weeks of day and night work is necessary to reduce these samples to drawings for American manufacture. It is significant of the rapid development of the art of aviation that not a single type of the original schedule has survived into the present program.

Rapid Progress Recently

During the past month, however, a responsive channel of communication with the Allies has been opened, the latest types adapted to American manufacture, the industry increased at least twentyfold, the training-plane problem solved and the production of battle planes begun. It is still very necessary, however, to view America's effort in aviation against the true perspective, both in this country and in Europe.

Secretary Baker points out in conclusion that the great problem now remaining is to secure the thousands of skilled mechanics, enginemen, motor repair men, wood and metal workers, etc., needed to keep the planes always in perfect condition. This great engineering and mechanical force at the airdromes, the flying fields and the repair depots, both here and behind the lines in France, is a vital industrial link in the chain to air supremacy. Without them the planes turned out would soon be useless and the flyers helpless.

At best the life of a plane is but two months, and the engine must be overhauled after 75 hours, while a pilot on a plane allowed to leave the hangars in imperfect condition is as helpless as a bird with a broken wing. Now that American battle planes are going overseas, a great increase in the volunteering of skilled mechanics is both essential and expected.

W. L. C.

The Brier Hill Steel Co., Youngstown, Ohio, has placed in operation two new sheet mills at its Western Reserve plant at Warren, Ohio. The completion of these mills gives this company eight mills at its Western Reserve plant and twenty-eight in all.

The Asbesto® Protected Metal Co., Pittsburgh, has removed its Boston office to the State Mutual Building, to be in charge of William H. Cummings.

NON-ESSENTIAL INDUSTRIES

Movement to Adjust from Within the Less Important Industrial Activities

An investigation of the so-called non-essential industrial activities of the country, looking to an adjustment from within for war winning purposes rather than on Government order, was voted by a meeting of the American Society of Mechanical Engineers held in New York on the evening of Feb. 21. The meeting passed a resolution calling on the governing board of the society to appoint a committee to get to work on the question at the earliest possible moment. The assemblage was one of the New York district membership, and it took this step to give the movement nation-wide scope. It was emphasized that no immediate good at least was likely in addressing the Administration or Congress, already overburdened with a flood of war-winning suggestions, and that industry itself without coercion should attempt to settle the problem.

Representatives of some ten or twelve industries had been invited to speak by the chairman of the meeting, George K. Parsons, consulting industrial engineer, New York. The burden of their contentions was that there are no non-essential industries. Thus for two hours strong defensive arguments were vouchsafed until Spencer Miller, Lidgerwood Mfg. Co., and a member of the Naval Consulting Board, entered the debate, and another hour was spent with impassioned speeches on the other side of the question, leading to the passage of the resolution.

At one point the discussion pivoted about the difficulty experienced by relatively small concerns in getting any opportunity to manufacture war material. Washington, it was held, had consideration only for industrial establishments which could produce on a large scale, and had not, as had Canada, taken advantage of plants of any size whatever.

Chairman Parsons in opening the meeting told how British industries had shown a greater profit for the last three months of 1917 than for the same period of 1916 by an average of 10.7 per cent, with real estate as high as 40.8 per cent and breweries 21.6 per cent, and that there were no checks so long as the materials were not pre-empted for war purposes. Calvin W. Rice, secretary of the society, emphasized the importance of a voluntary action by industries and thus the solving of the problem by agreement and not by edict. He mentioned the savings in coal consumption made, for example, by voluntary action of breweries and box-board manufacturers and pointed out the beneficial results of Hoover's taking the public into his confidence. He regarded it highly desirable to maintain industrial stability during the war to win the war and suggested that through engineering analysis of conditions relatively non-essential industries could be converted to war activities.

F. W. Keough, editor *American Industries*, asserted that there is no occasion for drastic decree; that Germany will repudiate her debts, and thus we must be prepared to compete with her industries after the war. The bare mention of the term non-essential industry had slowed down business, he said, and there was no sense in accelerating a depression for which we are due.

The silk, jewelry, paper and candy industries were heard from to prove they each were making contributions, and William Hamlin Childs, Barrett Co., declared that there is "not a manufacturer who would not shut down his shop to build a ship" and observed that the "Administration could not be accused of mobilizing the brains of the country."

Drastic Individual Taxes Advocated

P. M. Henry, vice-president American International Corporation, pointed out how the volume of governmental appropriations and the corresponding special business is bound to restrict certain lines, but he argued that it is not a governmental function in a democratic country like ours to decide what a non-essential is, and that the industries will have to adapt

themselves to the hardships. He favored the carrying on of a propaganda of self-denial for the individual and taxation so drastic that the individual who is not inclined to deny himself will be compelled to do so through high taxes.

Mr. Miller did not accept the frequent statements of speakers that there is no such thing as a non-essential industry and challenged them by a recital of things he regarded as distinctly unnecessary. Specialization on the part of the manufacturers will help win the war, he contended. "My concern makes 1000 different sizes and styles of machinery. We can make everything for a ship, but we are going to specialize in one thing. That is economy and efficiency."

No War Business for Small Plants

F. R. Porter, president Finley, Robertson, Porter Co., Port Jefferson, Long Island, N. Y., manufacturer of automobiles, declared that, although he had offered his factory to the Government and was in a position to place at the Government's disposal a staff of mechanics and machinists, his offer received no consideration, because his plant was too small. He said that, in his opinion, every automobile plant could be used, and the small plants should not be discriminated against.

Ford Motor Co. Starts Work on Plant to Build "Submarine Killers"

DETROIT, Feb. 25.—The Ford Motor Co., Detroit, started work last Friday on a \$2,000,000 plant on the River Rouge, just west of Detroit, for the manufacture of "submarine killers." The buildings, which will cover five acres, will be ready before May 10, a period of 75 days. Between 10,000 and 15,000 men will be employed. Of the total cost, buildings will represent about one-half and equipment the remainder. A canal from the River Rouge is now being dredged.

The buildings will be just north of the site of the proposed Ford blast furnaces. The fabrication shop will be completed first, plans calling for its finish by March 30. It is the smallest of the shops, and in it parts for the hulls will be made.

The general plan of the buildings will be similar in purpose to the plans of the Ford Motor Co. plant, allowing raw material to go in at one end and the finished product, ready for launching, come out the other. A large number of "killers" will be in the course of construction constantly. All of the power and mechanical parts for the boats will be made at the Highland Park, Mich., factory of the Ford company, at which a full-sized submarine chaser is being constructed at the present time as a model.

H. G. Christman, Detroit, is contractor for the building, and Albert Kahn, Detroit, architect. In constant attendance at the plant will be Commander Carlos Bean, inspector of machinery; Ensign Henry Eisman, superintendent of construction; Charles C. West, member of the naval commission, and Lieut. H. A. Thayer, cost inspector.

Orders for Locomotives

There have been placed in the past two or three weeks orders for over 150 locomotives. The American Locomotive Co. will build 13 for the Central of Georgia, 25 Mikados for the Missouri, Kansas & Texas, 15 Mikados for the Delaware, Lackawanna & Western, 5 Mikados for the Central Vermont, 20 mountain type for the South African Railways, 25 Mikados for the South Manchurian Railways and 5 Mikados for the Western Pacific. The Philadelphia & Reading will build 15 locomotives in its own shops and the Canadian Locomotive Co. will build 25 switch engines for the Grand Trunk.

The safety bulletin on ladders issued by the National Safety Council, Continental and Commercial Bank Building, Chicago, as one of its series of pamphlets on "Safe Practices" has been revised. Besides different forms of ladders and details of non-slipping bases, the pamphlet contains specification material.

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Stabilize Steel Prices

Five months of Government price-fixing in iron and steel have gone by, and but one month remains of the stipulated life of the arrangement renewed late in December. When the first agreement between the War Industries Board and the steel manufacturers was proclaimed by the President late in September the iron and steel trades began at once to hinge their calculations upon Jan. 1, the date of its expiration. Since Dec. 28, when the new proviso took effect, calling for price revisions in the event of new schedules being made starting with April 1, the latter date has been the pivot on which the entire industry has turned. If the plan had been to involve the business of makers and users of steel products in uncertainty and keep them in that state, the effort could not have been more successful.

Comparison of British and American regulation of iron and steel prices is not favorable to the latter. In Great Britain so-called control prices were established in March, 1916, and have remained unchanged, with the exception of advances in two or three products, for a stretch of two years. There has been no sword of Damocles over the industry, meanwhile, in the threat of revisions of prices, always, as in the United States, with the implication that reductions might be expected at the end of three months. The right of the industry to have conditions stabilized so far as might be, in war time, was recognized, and every aid was given by the Government to the development of full production.

We shall not go in detail into the differences between the British policy regarding iron and steel output and prices and the drawn-out efforts of Federal investigators at Washington to fix prices on a basis determined by the costs of most favored producers. That is a complicated question, and it was most unfortunate that its complications proved so attractive to the Federal Trade Commission and its large staff of investigators. We leave out of the present account also the whole question of the fairness to producers and consumers of the prices now existing. There may be some inequalities and some conditions have changed since the first agreement was made.

The one thing needful, as the steel industry is

again getting on its feet after the repeated blows of recent months, is that official assurance be given that the prices made effective April 1 will continue throughout the year. Two months have passed and nothing has come of the various proposals that were brought up in December as likely to affect the situation before April. The Pomerene bill has much less chance of passing than it had two months ago. The disaster industry has suffered at the hands of the Fuel Administration has made no friends for the extension of complete Government control to the production and sale of iron and steel. There is a very evident reaction in Washington opinion, and the statement of Senator Reed this week in denunciation of the Garfield policy reflects a growing feeling against the handing over of vast trade and industrial interests to the dictatorship of men inexperienced in business, however well meaning or however well educated in the courses of the schools.

Along with the Pomerene bill came the pooling plan for steel, favored by at least one member of the Federal Trade Commission; and there was also the request last December of Daniel Willard, then chairman of the War Industries Board, that the steel producers find a way to lower their prices and at the same time insure profits to the smaller non-integrated companies. Nothing has come of these proposals and nothing is likely to come in the single month between to-day and April 1. They involve economic problems too complicated for quick solution in war time.

The whole question of steel prices has been handled at Washington as though most of our steel output were plates. The concern of certain official men who have had to do with steel prices has grown out of the fact that in the plate trade are three or four mills which must buy pig iron in the market. There should be a solution of this plate problem without involving the 90 per cent or more of the finished steel output of the country that is not rolled on plate mills. Let the Government pay a special price to the non-integrated plate mills or let the price of all plates be raised so that the smaller plate mills can make a good profit. The War Industries Board and the steel manufacturers together should find their way through this plate question without involving other steel products of which the general consumption is many times

greater than the consumption of the Government.

It cannot be said too strongly that the reasons given for requiring the steel trade to inch along month by month in constant uncertainty are not good or sufficient reasons. The basic war industry should be fairly treated. The time has come to put an end to the hesitation and disturbance which have been so hurtful. Consumers and producers are in a position to do business covering the remainder of the year. They have a right to expect that the Government will open the way by making known promptly on what basis iron and steel can be bought and sold for the nine months beginning April 1.

The Unwritten Patriotic Law

THE IRON AGE has received numerous inquiries in regard to the so-called Government prices on iron and steel products, especially as to the binding effect of the prices on scrap and the power of the Government to enforce them. A reader at Springfield, Ohio, writes as follows:

We have been in touch with a number of large dealers and brokers in this State and they seem to be of the opinion that these maximum prices have a law behind them which enables the Government to enforce them and also further state that there is a penalty attached. On the other hand, we have large reliable dealers offering prices above the Government maximum price and we have tried on various occasions to buy scrap, and our people state that they have been offered prices which are way above the maximum price. We are extremely desirous of being straightened out on the point as to whether or not the Government maximum prices have a law behind them which can be enforced, and, if so, just what committee and just what authorities made the maximum prices and law.

Except in the case of coke, the prices of which are regulated under the Lever act, commonly known as the food, feed and fuel law, the maximum prices as published in the pamphlet of the American Iron and Steel Institute are not based on any statute which will be found in the enactments of Congress. Sometimes, however, an unwritten law is even stronger, is more capable of enforcement and has a better reason for existence than the enactment of any legislative body.

In the case of the agreed prices on iron and steel products, the unwritten law is founded on patriotism and every man in the trade who really desires to see the United States and its allies win this war is morally bound to respect this unwritten law and to do his utmost to enforce it. The prices which have been agreed upon by representatives of the President of the United States and representatives of the great iron and steel industry are, like all man-made things, imperfect, but they represent the best judgment of the officials and business men who have been giving their time and thought to their consideration for many months. In some cases, notably in those of various grades of scrap, there have been misunderstandings and in a few instances prices have not been equitable, but the new regulations concerning scrap just announced by Judge Gary and published elsewhere in this issue of THE IRON AGE, make prices more definite and equitable and

remove any excuse that may have existed for not following the schedule as heretofore announced. Some changes as to prices of other products as well as scrap will probably be necessary from time to time, and it will be incumbent upon all who wish to co-operate with the Government and the American Iron and Steel Institute not to be captious, but to adhere loyally to the general principles and follow the spirit as well as the letter of the unwritten law.

A vast majority of buyers and sellers have earnestly supported the movement to regulate prices without the enactment of a law by Congress. They have believed that it is highly desirable for manufacturers and their customers to regulate prices by co-operating with the Government rather than to compel it to be done by such an enactment as the Pomerene bill, now pending in the Senate, which would permit the Government to take over the iron and steel business in much the same way that it has assumed control of the railroads. All who disregard the agreed prices are inviting drastic action at the hands of Congress.

Progress in Metallography

Metallographic research has achieved important results in recent months. This is true not only in steel and iron but in other metals. In its early stages metallography was valuable from a scientific or theoretical standpoint or because of the possibilities which it held in store. To-day it has also a practical value which grows more significant as its achievements are understood. Twenty years ago it was in its infancy; twenty-five years ago it was just being introduced into the curriculum of technical institutions.

At the meeting last week of the American Institute of Mining Engineers the statement was made that the firing life of large naval guns has been increased recently more than 50 per cent. While details could not be revealed, it was acknowledged that the work of Dr. Henry M. Howe and others was entitled to a large share of the credit. This work was the metallographic study of the eroded lining of a big gun. Other results growing out of this research were deemed important but at present are secret. The erosion is largely due to the sudden heating and cooling of the metal as well as to the rush of the projectile and the hot gases, with a resulting change in the structure of the steel. It is possible that the microscope will disclose a metal of such structure that erosion will become a much less vexing problem.

Another indication of the progress in metallography is the fact that important heat-treating and other problems, which it took months to solve only a few years ago, are now explainable in less than as many weeks. Further, the quality of the product is markedly superior to that formerly obtained. Heat treating of steel is fast becoming an exact science.

A line of metallographic research in which the advance is marked is the study of grain growth. Under the investigations of Howe, Ruder

and Jeffries facts are being brought out which promise valuable results, making clear a subject which to many has been purely theoretical and uninteresting. The fact that grain size is dependent on temperature, cooling and other conditions and that grain size and growth are important factors in a metal's static, dynamic and other properties is gaining recognition. In some metals the larger the grain the stronger the product, while the opposite is true in other cases. The application of the laws of grain growth has solved some important metallurgical problems and promises important results in others.

Little has been done in the metallography of certain metals. As indicating greater expectations is the fact that a large aluminum company has just erected a research department costing many thousands of dollars and put at its head one of the foremost metallographists of the country.

The Scrap Situation

It is expected that the new sub-committee on iron and steel scrap of the American Iron and Steel Institute will exert itself to prevent hoarding in producers' or dealers' yards and otherwise facilitate the free movement of old material to steel works, rolling mills, foundries and blast furnaces. In some districts there are fairly liberal supplies of heavy melting steel, this being particularly true of Chicago, Cleveland and Philadelphia, while in the Pittsburgh district, the largest consuming center, there is a shortage, largely due to the difficulties of railroad transportation.

Another cause contributing to the so-called shortage of scrap is the fact that railroads have not permitted the shipment of mixed cars to scrap yards. As soon as the railroad congestion is sufficiently relieved this embargo against shipment of mixed cars will probably be lifted and the yards will undoubtedly find more scrap flowing to them than is required by consumers.

With the possible exception of the Pittsburgh district, steel plants are supplied with scrap for the next 30 or 60 days, and consequently there is no great demand. When the railroad situation improves sufficiently, the over-production elsewhere will naturally flow to the Pittsburgh district. No serious shortage should develop within the next three or four months, during which time the accumulations of the winter will be sold; but in the late fall and early winter, if steel plant operations are conducted at full capacity, a shortage may come, and the sub-committee on iron and steel scrap will need to make its plans soon to obviate this so far as possible.

The importance of a free movement of scrap will be impressed upon the railroad administration in Washington. These officials must be shown that it is as important for the mills to receive their supply of scrap as to receive any other commodity, and railroad regulations may be suggested which will make scrap movement easier.

That the country may be saved from a scrap famine next fall or winter, the new committee should be clothed with sufficient authority to commandeer supplies in yards if necessary and to take

steps to insure a country-wide gathering of old material during the summer months. The decrease in pig iron production will result eventually in a demand for scrap much greater than has been known in previous years. The latest available figures on scrap consumption, those for 1916, show a total above 12,000,000 tons—an amount likely to be considerably exceeded this year, if the material becomes available.

"Unessential" Steel Consumption

The chief difficulty in the problem of eliminating the "unessential" consumption of steel is to find the unessential consumption that is going on. It reminds one of the recipe for making a rabbit pie. Washington continues to consider the matter, however, and apparently with renewed interest in the past fortnight. If this is a recrudescence of certain ideas entertained last October and November it is pertinent to observe that meanwhile much water has passed through the mill. A great deal of steel consumption has already been eliminated, some by the voluntary decision of the consumers involved, some by the force of circumstances, or, to be explicit, the inability to secure the steel for the purpose of consuming it.

To the steel industry, operating at barely two-thirds of capacity in the past three months, and diverting two-thirds of this meager output to war uses, the problem of bringing about reasonably full production seems much more important than the question of taking away from the ordinary commercial consumer the modicum of steel he has lately been able to obtain. The highly specialized character of the steel industry, in its methods of converting crude steel into finished product, makes dangerous any attempt to curtail the total consumption of steel by touching specific consuming industries. The practical fact is that plates are plates and merchant bars are merchant bars. The fact that both have their origin in the steel ingot may, in practical application, be found to have nothing to do with the question.

It should be left to be seen, a few weeks' time being presumably sufficient, whether the production of steel, as steel, can be greatly increased. If, to attempt a specific statement, production of steel for three months has been at two-thirds capacity, and commercial consumers have received only one-third the tonnage produced, the two-ninths is not much to strike at, and with increased production might perhaps be doubled without the work of war feeling it at any point.

Prosecution of the war does not require the various descriptions of finished steel in the proportions that obtain in peace times, yet the steel industry is so specialized that when operating its steel-making units at capacity it cannot depart very far from those proportions. Furthermore, the work of getting ready has involved a call for a wider range of finished steel products than will be needed when the war machine is in full working order. Certain materials in future will be called for in smaller proportions, others in larger proportions, and in the event of full or nearly full production of ingots there is very likely to be steel

for some finishing departments unable to take the steel unless they are supplied with commercial orders. It would be very difficult, indeed, to look forward and insist that a given consumer must be denied a particular form of steel, because that form of steel could be profitably employed elsewhere.

Consumers must look ahead, and any blanket order, therefore, would be unnecessarily disturbing if another method of reaching the same result could be employed that would be more flexible in its operation. Such a method has been in use for a long time, that of prescribing the sequence in which orders shall be filled. It is hardly necessary to assert that "there is not going to be any core." Perhaps it may be sufficient to let the prospective claimant wait and see.

The big business of the country is winning the war, but it is well not to lose sight of after-war conditions of industry. We are repeatedly reminded by actual competition that England has time to keep her hands on export possibilities while Washington is still inclined to look askance at private commercial enterprise. Our exporters accept cheerfully the embargoes on exports and even the license restrictions on imports, but they would like to see at home some of the paternal interest exhibited in behalf of business by the British Government. They fear that our Administration is supine in the matter of business cables. It is often impossible to send such cables and apparently they are used at times to our disadvantage. They think too much effort is made to widen the application of the one-price-for-all policy, while ferromanganese and pig tin, for example, which are under British regulation, seem to be allowed to react freely to the old law of supply and demand. They do not take kindly to the suggestion, made, to be sure, in a very indirect way, that more private foreign buying be done under the guise of defense material when similar purchases, as of steel bars, are found to work back to 5c., British mill. With \$125 per ton ocean freight, it is of course difficult to do business at any price except by making early delivery. Some of our commercial practices will undoubtedly soon be rectified, such as that by which railroad licenses for export are issued for a thirty-day period in connection with a three months' export license. No sizable steel order could well be scheduled in a month. The one being useless without the other, both should have a common time basis.

Last of Heatless Mondays

WASHINGTON, Feb. 26.—Because of improved weather and transportation conditions in New England, but more especially because labor has been rapidly drifting away from western Connecticut and Massachusetts into New York, the fuel administrators for Maine, Rhode Island, New Hampshire, Vermont, Connecticut and Massachusetts have decided to suspend the operation of the "heatless" Monday order of the United States Fuel Administration, which a fortnight ago was lifted everywhere except in New England.

The manufacturers of Dayton, Ohio, are working jointly to prepare homes for workmen needed in eight or ten of the largest plants there for making war munitions.

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Old Material Prices and Rules Revised

New Schedule Announced, Following Meeting of American Iron and Steel Institute Committees— Commission Provision Being Considered

As a result of the deliberations of the Committee on Steel and Steel Products of the American Iron and Steel Institute and the newly appointed committee on iron and steel scrap, a statement has been issued by Judge Gary making some important changes in prices and regulations relating to old material. For the most part, the changes are in the nature of more detailed description of various products, particularly low phosphorus steel scrap, No. 1 railroad wrought and cast iron scrap.

Serious objection had been made to including No. 1 busheling scrap in the same classification and price as No. 1 railroad wrought. The new provision is that busheling scrap may be dealt in at a maximum of \$3 per ton under the price of No. 1 railroad wrought, or \$32. Cast iron scrap and malleable scrap in cupola shape are advanced \$5, making the new price \$35, while the price for steel plants remains at \$30. The subject of payment of commissions is held for further consideration.

Judge Gary's Statement

Judge Gary's statement has been printed as a four-page supplement to the pamphlet showing maximum prices on iron and steel products and will be sent in that form to any one who so requests. The size of the supplement is $3\frac{1}{2} \times 6$ in., and it could easily be inserted in the pamphlet, superseding page 14 of that document. Judge Gary's statement is as follows:

An announcement was made on Nov. 5, 1917, with the approval of the President of the United States, fixing the maximum base prices on iron and steel scrap as follows:

No. 1 heavy melting, \$30 per gross ton.

No. 1 railroad wrought, \$35 per gross ton.

Machine-shop turnings and cast-iron borings, \$20 per gross ton.

All delivered to consumers' mill.

On Dec. 28, by the authority of the President, these base prices were continued operative until March 31, 1918.

By this announcement it was intended that no one—either producer, consumer, merchant or broker—should buy, sell or deal in scrap iron and steel at any figure in excess of the base prices announced.

On Dec. 27, 1917, the chairman of the Committee on Steel and Steel Products of the American Iron and Steel Institute announced differentials on iron and steel scrap, which are hereby canceled, together with any interpretations subsequently announced. On and after Feb. 21, 1918, the following differentials as recommended by the Sub-Committee on Scrap Iron and Steel and approved by the Committee on Steel and Steel Products, shall be in effect:

No. 1. NO. 1 HEAVY MELTING STEEL.

BASE MAXIMUM \$30.00

No scrap to be used for remelting into steel shall be dealt in at a price in excess of the maximum base. This shall include all steel, wrought iron, cast iron carwheels, malleable scrap or other grades to be melted in basic open-hearth furnaces (except as noted in clauses 2, 3 and 4).

No. 2. LOW PHOSPHORUS STEEL SCRAP.

(a) To be used only in plants operating acid open-hearth furnaces, crucibles or electric furnaces. This grade, which shall consist of billet, bloom, bar and plate crop-ends, axle butts and new mill plate shearings $\frac{1}{4}$ in. thick and heavier, no piece to weigh less than 10 lb., all in charging-box shape and which will analyze 0.04 and under in both phosphorus and sulphur, may be dealt in at a differential of not exceeding \$10.00 per ton over the base price of heavy melting steel MAXIMUM \$40.00

(b) All other grades of low phosphorus steel scrap to be used in such plants, which will analyze 0.04 and under in both phosphorus and sulphur, may be dealt in at a differential of not exceeding \$7.50 per ton above the base price of heavy melting steel MAXIMUM \$37.50

(c) Special steel for use in such plants, but which will not analyze under 0.04 in phosphorus and sulphur, may be

dealt in at a differential of not exceeding \$5.00 per ton above the base price of heavy melting steel. Such special steel shall include steel knuckles and couplers, rolled steel wheels, railway steel springs, carbon tool steel and similar material in quality and character, suitable for mills of this kind.

MAXIMUM \$35.00

Note.—Material under this classification may not be dealt in for use by basic open-hearth plants using charging boxes at a price in excess of the maximum allowed for heavy melting steel (\$30.00).

No. 3. Steel rails, structural steel or similar scrap which has been especially sheared to short lengths for use in cupolas, hand-charging furnaces or for rerolling purposes may be dealt in at a differential of not exceeding \$5.00 above the base price of heavy melting steel MAXIMUM \$35.00

Note.—Material under this classification may not be dealt in for use by basic open-hearth plants using charging boxes at a price in excess of the maximum allowed for heavy melting steel (\$30.00).

No. 4. Standard section old steel tee rails, free from frog, guard and switch rails, 56 lb. per yard and heavier, 5 ft. and over in length, suitable for and to be used only for rerolling purposes, may be dealt in at a differential of not exceeding \$5.00 per gross ton over the price of heavy melting steel MAXIMUM \$35.00

No. 5. NICKEL STEEL.

Nickel steel scrap, excluding turnings, and containing not over one-half of 1 per cent of chrome, may be dealt in at the maximum price of heavy melting steel plus a differential of not exceeding \$4.00 per ton per unit on the nickel content.

No. 6. NO. 1 RAILROAD WROUGHT MAXIMUM \$35.00

(a) No. 1 railroad wrought scrap may be dealt in at a price of not exceeding \$35.00 per gross ton.

(b) When wrought scrap is especially sheared or prepared for piling or fagoting purposes to lengths of not under 10 in. or over 24 in., it may be dealt in at a differential of not exceeding \$5.00 per ton over the base price of No. 1 railroad wrought, but this may not include short wrought or other material which has not been especially prepared MAXIMUM \$40.00

(c) Wrought-iron railroad angle or splice bars, iron or steel shafting, suitable for rerolling, old iron rails, iron boiler-plate cut apart in sheets and rings, wrought iron bridge scrap cut apart and similar wrought iron suitable for making sides and bottoms for box piling, may be dealt in at a differential of not exceeding \$5.00 over the base price of No. 1 railroad wrought MAXIMUM \$40.00

(d) No. 1 yard wrought, railroad track scrap and short wrought, also wrought iron and steel pipe, when 1 in. and over in diameter, 2 ft. and over in length, free from dirty, painted, enameled or coiled and bent material, may be dealt in at a maximum of \$1.00 per ton under the base price of No. 1 railroad wrought MAXIMUM \$34.00

(e) The commodity known in the trade as No. 1 busheling scrap, when suitable for and to be used only by mills manufacturing bar iron, may be dealt in at a maximum of \$3.00 per ton under the base price of No. 1 railroad wrought. MAXIMUM \$32.00

(f) Ungraded wrought iron and steel pipe and tubes, steel boiler-plate cut apart, in sheets and rings, country wrought and soft steel mixed, may be dealt in at a maximum of \$5.00 under the base price of No. 1 railroad wrought scrap. MAXIMUM \$30.00

No. 7. Iron and steel railway axles, arch-bars and transoms, old locomotive tires smooth inside, and sheet bar crop-ends, when suitable for and to be used only for rerolling purposes, may be dealt in at a differential of \$12.50 per ton over the base price of No. 1 railroad wrought.

MAXIMUM \$47.50

No. 8. CAST IRON SCRAP.

(a) All cast iron scrap, whether broken or unbroken, including unbroken cast iron car wheels, may be dealt in at a maximum price not exceeding that of heavy melting steel, except as noted in Clause b. MAXIMUM \$30.00

(b) Cast iron scrap in cupola shape, in pieces not exceeding 150 lb., including broken cast iron carwheels, when suitable for and to be used only in cupolas or in puddling

furnaces, may be dealt in at a differential of not exceeding \$5.00 per ton over the maximum price of heavy melting steelMAXIMUM \$35.00

(c) Malleable scrap of all kinds may be dealt in at not exceeding the maximum price of heavy melting steel. (Exception—as noted in Clause d).....MAXIMUM \$30.00

(d) Malleable scrap in cupola shape, in pieces not over 150 lb., when suitable for and to be used only in malleable works, may be dealt in at a differential of not exceeding \$5.00 per ton over the maximum price of heavy melting steelMAXIMUM \$35.00

Note.—Cast-iron scrap or malleable scrap of any description may not be dealt in for use by basic open-hearth furnaces at a price in excess of the maximum allowed for heavy melting steel (\$30.00).....MAXIMUM \$20.00

No. 9. MACHINE SHOP TURNINGS.

(a) The term "machine shop turnings" shall apply to all grades of iron or steel turnings except as noted in clauses b and c.

(b) Heavy axle and forge turnings, or their equivalent, may be dealt in at a price of not exceeding \$5.00 per ton over the maximum price of machine-shop turnings.

MAXIMUM \$25.00

(c) Nickel steel turnings containing not over one-half of 1 per cent of chrome may be dealt in at a price of not exceeding \$5.00 per ton over the base price of machine-shop turnings, plus a differential of not exceeding \$4.00 per ton per unit on the nickel content.

No. 10. CAST IRON BORINGS.....MAXIMUM \$20.00

This classification shall cover all grades of cast iron borings except for the special purpose indicated in clause (a).

(a) Cast iron borings and steel turnings, when suitable for and to be used only by chemical plants or plants operating for purposes other than the remanufacture into iron or steel products, may be dealt in at a differential of not exceeding \$5.00 above the base price.....MAXIMUM \$25.00

The above prices are the maximum which may be paid; buyers and sellers may contract at any price below the figures named.

All the above prices and differentials are per gross ton of 2240 lb., and in all cases include all freight and charges delivered f.o.b. cars at the consuming mill. For further information, communicate with W. Vernon Phillips, chairman, Sub-Committee on Scrap Iron and Steel, American Iron and Steel Institute, Pennsylvania Building, Philadelphia.

New Rules Well Received—Some Explanations

From the various market centers in which iron and steel scrap is dealt in, reports reaching THE IRON AGE indicate that the new prices and regulations announced by Judge Gary have greatly relieved a tangled situation. Many conflicts had arisen under the former differentials, which the new differentials will clear up to a considerable degree.

The Committee on Steel and Steel Products will give further consideration at a meeting this week to the provision in the former schedule calling for the payment of 3½ per cent commission by consumers to dealers and brokers. No agreement was reached at last week's meeting. Meanwhile, sales are being made subject to whatever action the committee decides to take.

Under the former differentials, a great deal of material was being sold as heavy melting steel, which formerly had been otherwise graded. This was due partly to the great need of the steel plants for scrap and their willingness to accept all kinds of material with a minimum of rejections and it became easier to ship material to the steel plants than to perform the special preparation of various other grades of material desired by foundries, puddling furnaces and other consumers. It had become difficult for foundries and bar iron makers to get sufficient iron for their needs under the old arrangement of differentials.

A feature of the new regulations is the insistence throughout that basic open-hearth furnaces shall not pay more than \$30 per gross ton for steel, wrought iron, cast or malleable scrap, though other consumers are permitted to pay more. Three different grades of low phosphorus scrap were provided for because of the belief of steel makers that new material, such as crop ends of ingots, axle butts and new mill plate shearings guaranteed as to analysis and in charging box shapes should be sold at the top price, which was fixed at \$40. Used low phosphorus material, which is guaranteed to be 0.04 and under in phosphorus and sulphur, is to be sold at a maximum of \$37.50, while material not so guaranteed will be sold at a maximum of \$35.

The new prices provide for the payment of \$35 for steel rails, structural steel or similar scrap, which has been cut to short lengths for use in cupolas, hand charging furnaces or for re-rolling purposes, as compared with \$33 permitted under the former schedule. Standard section old tee rails, free from frog, guard and switch rails, 56 lb. per yd. and heavier and 5 ft. and over in length, may be sold for re-rolling purposes at \$35.

Crucible steel plants asked for a schedule covering nickel steel scrap, so it was decided that this might be sold at the same price as heavy melting steel, \$30, plus a charge of \$4 per unit on the nickel content. The standard material contains 3½ per cent nickel, on which the price will be \$44 per ton.

One of the most serious difficulties under the old

schedule was the handling of sales of wrought scrap. Sellers were permitted to charge \$35 per ton, but nothing was said about a charge for cutting to short lengths for box piling in puddling furnaces, with the result that dealers were charging all the way up to \$7.50 per ton for this service. This extra made it profitable to cut long wrought into short lengths, with a resulting scarcity in long wrought. The new schedule provides for a \$5 extra for cutting wrought scrap to lengths not under 10 in. nor over 24 in.

A new classification was made to cover wrought iron, railroad angle or splice bars, iron or steel shafting, suitable for re-rolling, old iron rails, iron boiler plate cut apart in sheets and rings, wrought iron bridge scrap cut apart and similar wrought iron suitable for making sides and bottoms for box piling. A maximum price of \$40 is fixed. Some of this material had been selling under the classification for steel railroad axles at \$47.50 per gross ton.

Another new classification covers No. 1 yard wrought, railroad track scrap and short wrought, also wrought iron and steel pipe, when 1 in. in diameter and over, 2 ft. and over in length, free from dirty, painted or enameled or coiled and bent material. This material may be sold at a maximum of \$34. This classification was made to distinguish between railroad and yard wrought.

No. 1 busheling was fixed at \$32 for use in mills making bar iron only. In some districts, a large part of the material formerly classified as No. 1 busheling had been going in as heavy melting steel. Hence a shortage developed at bar iron mills.

Country wrought scrap may be sold at a maximum of \$30.

No change was made in the price for iron and steel railroad axles, arch bars and transoms, etc., which may still be sold at a maximum of \$47.50.

A change was made in the price of cast iron scrap, when sold for foundry or rolling mill use. These consumers may pay as high as \$35, although \$30 is the maximum that steel plants may pay. But the pieces to foundries and rolling mills must not exceed 150 lb. in weight and carwheels must be broken. The same provisions cover malleable scrap.

Heavy axle and forge turnings may not be sold up to \$25 per gross ton. The former classification of machine shop turnings presumptively covered the heavier turnings, but dealers would not sell the heavier material at \$20 and had been obtaining \$22 to \$25. A special provision is made for nickel steel turnings.

The price of cast iron borings and steel turnings remains at \$20, with the provision that plants using them for purposes other than re-manufacture into iron or steel may pay up to \$25.

Suggestions that prices be made f.o.b. shipping point were considered but negative action was taken.

Iron and Steel Markets

STEEL MAKERS TO MEET

A Stand for Stabilized Prices

Mill Operations Increased, but Car Shortages Are Still a Serious Factor

The improvement in iron and steel works output has gone farther, as indicated by 75 per cent blast furnace operations at Steel Corporation plants, accompanied by 85 per cent active ingot capacity and 80 to 85 per cent in rolling mills. Some companies have not fared so well. Eastern Pennsylvania, which was hardest hit, is still very short of coke and blast furnaces there have scarcely exceeded a 50 per cent operation, with steel works at 60 per cent or less.

Pittsburgh and nearby districts are suffering from new car shortages. Loaded cars have left the mills but are not returning, and the giving of special priority to food shipments has resulted in the sending of empty cars all the way from the East to the far West. Coke shortages are much aggravated from this cause.

Steel manufacturers will confer in New York on Friday preparatory to a meeting with Government representatives to consider the prices that will prevail after April 1. Steel producers, after months of hamperings, with steadily advancing costs, now ask for stabilized prices over a period of six to nine months. The uncertainty as to prices and pig iron and steel supply is beginning to check consuming industries in a number of lines and the next conference at Washington is considered of more moment than any that have preceded it.

Foundry operations have been curtailed here and there for lack of pig iron, but there are also cases in which the demand for castings has fallen off because certain industries in the less essential class have found their sales diminishing or have had to stop for lack of fuel.

Inquiries recently before the market from Canadian shipyards have been withdrawn and the needs of these yards, which are put at 300,000 tons for the year, will be supplied by American mills under Government arrangement, the distribution being made at Washington. At Toledo, Ohio, four vessels have been booked that will take about 10,000 tons of steel.

With more plates available for general use, demand is cropping up. Oil companies are now planning to add to their field tank capacity, and from other directions feelers are being put out. At Cleveland an order for 13,000 tons of light plates for submarine fighters is one result of the new activity at Detroit.

The belief that even more ship plates can be rolled than will be needed at home is indicated by an offer of 3.75c. at mill on a large tonnage for export—quite a little below what has been regarded as the export market.

On some of the Japanese ship plates on which rollings were held up by the embargo last year, credits have now run out. The proposed new placing of this business, amounting to many thousands of tons, at Government prices as against 9c. and 10c. in the original contracts, is a factor in the negotiations between the two governments. It will bear in an important way on the prices the Government will pay for Japanese ships.

Fabricated-steel business dropped to 95,000 tons in January, from the 205,000-ton total of December. When the rush for munitions plants had run its course in 1915, culminating in 208,500 tons of fabricated work in December of that year, the total for January, 1916, fell to 119,000 tons. The recent large lettings of fabricated steel for ships now leave little before the bridge and structural shops.

A proposal to tear up the rails of the Hudson Bay Railroad for war purposes abroad lends interest to an effort to sell some 65,000 tons of heavy rails, bought and paid for by what was once Russia, but still stored in this country. They may yet be turned to account for the Allies, and the question of title be settled afterward.

France has bought 1500 forgings for 155-mm. guns and 250 for 75-mm. guns. The transaction is added evidence of her inadequate raw-material supplies, but of abundant gun-making facilities.

The effort to make sure of full pig-iron supply through the year has led to a scramble in some districts for what the blast furnaces have to sell. Makers are declining a good deal of offered business, and while their contracts carry the provision for adjustment of prices, if necessary, after April 1, they are disposed to await the next price-fixing conference.

The scrap trade is accepting the various new rulings of the regulating committee, notwithstanding the deviations from long-established price relations. Opposing views on the question of commissions to holders of yard stocks have not yet been threshed out, and meanwhile authority for the payment of commissions is lacking. On the decision hangs the movement of a considerable tonnage of heavy melting steel, which would require some inducement to draw it to the Pittsburgh district.

Pittsburgh

PITTSBURGH, Feb. 26—(By Wire).

The railroad congestion here is being rapidly cleared up in the direction that thousands of loaded cars stored in the various railroad yards have been moved out to their destination, but the trouble now is that these cars are not being returned and the shortage in supply of cars for loading is about as serious as it has been at any time during the winter months. It is said that fully 500 cars of foodstuffs are being sent East daily from Chicago and Kansas City, probably 75 per cent or more of these from Chicago, and when these cars reach the Eastern terminals and are unloaded they are sent back West empty and shippers do not have the advantage of using them. There is a good deal of criticism over this system in use by the railroads, but the Food Administration states that it does not want any delay in the return of these cars and therefore they are

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 27 1918	Feb. 20 1918	Jan. 30 1918	Feb. 28 1917
No. 2 X, Philadelphia....	\$34.25	\$34.25	\$34.25	\$33.00
No. 2 Valley furnace....	33.00	33.00	33.00	35.00
No. 2 Southern, Cincin...	35.90	35.90	35.90	28.90
No. 2, Birmingham, Ala.	33.00	33.00	33.00	26.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	33.00
Basic, deliv., eastern Pa.	33.75	33.75	33.75	30.50
Basic, Valley furnace....	33.00	33.00	33.00	30.00
Bessemer, Pittsburgh...	37.25	37.25	37.25	35.95
Malleable Bess., Chicago*	33.50	33.50	33.50	33.00
Gray forge, Pittsburgh...	32.75	32.75	32.75	31.95
L. S. charcoal, Chicago...	37.50	37.50	37.50	35.75

Rails, Billets, etc. Per Gross Ton:	Feb. 27 1918	Feb. 20 1918	Jan. 30 1918	Feb. 28 1917
Bess. rails, heavy, at mill.	55.00	55.00	55.00	38.00
O.-h. rails, heavy, at mill.	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh...	47.50	47.50	47.50	65.00
O.-h. billets, Pittsburgh...	47.50	47.50	47.50	65.00
O.-h. sheet bars, P'gh....	51.00	51.00	51.00	65.00
Forg'g billets, base, P'gh.	60.00	60.00	60.00	90.00
O.-h. billets, Philadelphia.	50.50	50.50	50.50	65.00
Wire rods, Pittsburgh...	57.00	57.00	57.00	80.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	3.685	3.685	3.685	3.409
Iron bars, Pittsburgh...	3.50	3.50	3.50	3.25
Iron bars, Chicago.....	3.50	3.50	3.50	3.00
Steel bars, Pittsburgh...	2.90	2.90	2.90	3.25
Steel bars, New York....	3.095	3.095	3.095	3.419
Tank plates, Pittsburgh.	3.25	3.25	3.25	5.00
Tank plates, New York...	3.445	3.445	3.445	5.169
Beams, etc., Pittsburgh...	3.00	3.00	3.00	3.25
Beams, etc., New York...	3.195	3.195	3.195	3.419
Skelp, grooved steel, P'gh.	2.90	2.90	2.90	3.50
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	3.75
Skelp hoops, Pittsburgh..	3.50	3.50	3.50	3.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton. †For steel plant use.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Feb. 27 1918	Feb. 20 1918	Jan. 30 1918	Feb. 28 1917
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	4.75
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	6.75
Wire nails, Pittsburgh...	3.50	3.50	3.50	3.00
Cut nails, Pittsburgh...	4.00	4.00	4.00	3.70
Fence wire, base, P'gh...	3.25	3.25	3.25	2.95
Barb wire, galv., P'gh...	4.35	4.35	4.35	3.85

Old Material: Per Gross Ton:	Feb. 27 1918	Feb. 20 1918	Jan. 30 1918	Feb. 28 1917
Carwheels, Chicago.....	\$20.00	\$30.00	\$30.00	\$18.00
Carwheels, Philadelphia..	30.00	30.00	30.00	20.50
Heavy steel scrap, P'gh.	30.00	30.00	30.00	22.00
Heavy steel scrap, Phila.	30.00	30.00	30.00	22.00
Heavy steel scrap, Chi'go.	29.50	29.50	30.00	22.25
No. 1 cast, P'gh†.....	30.00	30.00	30.00	20.00
No. 1 cast, Philadelphia†.	30.00	30.00	30.00	20.00
No. 1 cast, Chicago (net ton)†	26.75	25.50	26.00	16.00
No. 1 R.R. wrot., Phila.	35.00	35.00	35.00	27.00
No. 1 R.R. wrot., Chicago (net)	31.25	31.25	31.25	24.00

Coke, Connellsville, Per Net Ton at Oven:	Feb. 27 1918	Feb. 20 1918	Jan. 30 1918	Feb. 28 1917
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$12.00
Furnace coke, future....	6.00	6.00	6.00	7.00
Foundry coke, prompt...	7.00	7.00	7.00	13.00
Furnace coke, future....	6.00	6.00	6.00	7.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	23.50	23.50	23.50	26.50
Electrolytic copper, N. Y.	23.50	23.50	23.50	26.50
Spelter, St. Louis.....	7.75	7.75	7.62½	10.50
Spelter, New York.....	8.00	8.00	7.87½	10.75
Lead, St. Louis	7.10	6.85	6.85	9.62½
Lead, New York.....	7.25	7.00	7.00	9.75
Tin, New York.....	85.00	85.00	85.00	50.50
Antimony (Asiatic), N.Y.	13.50	13.50	14.00	31.00
Tin plate, 100-lb. box, P'gh.	\$7.75	\$7.75	\$7.75	\$7.50

sent back empty. It is claimed that nearly all of these cars could be loaded in less than 12 hr. by plants in the Pittsburgh district and then sent West, and the total delay would not be over 36 hr. A case in point of the extremities to which shippers are put in trying to get shipment to their customers is that very recently a large manufacturer had a full train load of pipe for the East, but could not get the roads to accept it for direct shipment. So this train load of pipe was first sent over the Baltimore & Ohio to Painesville, Ohio; picked up there by the Nickel Plate and taken to Buffalo, and from there to an Eastern terminal over another road. Another example that occurred recently is that several train loads of tin plate were sent from the Newcastle, Pa., district intended for the Pacific Coast for the canneries for the salmon pack. When these trains got to Chicago they were broken up and only about 40 cars sent to the Pacific Coast, the remainder being distributed around the Chicago yards and, so far as known, are still there. These are some of the things with which shippers are contending in trying to get cars and get them moved to destination. Some embargoes have been removed, but these have not helped out very much, as shippers claim they cannot get cars and consignees say that when they apply for permits for cars to be loaded they are either refused or else the delays are so long that the railroads refuse to accept the permits when they are issued. It will take a long time for the railroads to work out a better condition in transportation and it seems much of the delay is due to red tape. Railroad officials here say they operate their roads under a certain system. The officials at Washington are not familiar with these systems and the result is that they cannot get together and long, annoying delays follow. It is a fact that some cars loaded in the Pittsburgh district in late December and early January have

not yet been delivered at destinations that in some cases are not more than 100 miles from the shipping points. The mild weather is helping out a good deal, but it will require closer co-operation and a better understanding between local railroad officials and those at Washington in charge of operation of railroads before the situation is greatly improved. As March 31 draws nearer, the belief is getting stronger that there will not likely be any revision in prices in iron and steel articles at that time. When the Government named prices on pig iron, steel and finished products, as well as raw materials, these were based on costs, comprehensive exhibits of which were sent to Washington by every manufacturing concern in the country. It is hardly to be expected that any revision in prices would be made to a lower basis without another exhibit of costs, and if this is called for by the Government it will be found that costs in the first quarter of this year were very much higher than in the third or fourth quarters of last year. This heavy increase is largely due to the extreme cold in January and early February, when operations of blast furnaces, steel works and finishing mills were down to a 50 per cent basis or less. This meant a heavy increase in costs, which with some concerns amounted to \$6 per ton or more on finished steel, while to some smaller concerns not self-contained the increase was no doubt greater. A general meeting of heads of steel companies is to be held in New York Friday morning, this week, at 10 o'clock, at which present conditions in the steel business will be thoroughly discussed, and the sense of this meeting will no doubt be sent to Washington, so that the Government will have a clear understanding of the difficulties in operations, due largely to the bad railroad situation that almost paralyzed the steel business in December, January and the early part of this month. The feeling is that if the

Government would reaffirm present prices on iron and steel, say, for six months, it would be the best thing that could happen to the steel industry and would give a stability to prices that is now lacking. Very little new business is being placed in iron and steel products of any kind, the mills being more concerned in trying to get shipments or orders on their books that should have gone out long ago. Indications point to a heavy output of pig iron and steel in March, unless severe weather should in the meantime upset this expectation. Many blast furnaces have blown in since the mild weather came and the railroad congestion started to clear up, and with the present free movement in coke output for March in pig iron and steel ought to be the largest in any one month for a long time.

Pig Iron.—The merchant blast furnaces that sell their pig iron in the open market have gotten so far behind in shipments on account of the railroad congestion that they are not trying to take on any new business, which they could very readily secure by simply quoting official prices. This applies only to shipments of iron to be made in the next two or three months. The situation in regard to sales of pig iron for the last half of the year is entirely different. Many concerns that are working on war contracts are anxious to be assured of a supply of pig iron in the last half of the year, and several large makers of pig iron have been willing to sell for that delivery. Fairly heavy sales of Bessemer and basic, also of foundry and malleable Bessemer iron, for last half of the year delivery have been made. It is said these sales will amount to 100,000 tons or more, and all the contracts contain a clause to the effect that prices to rule at the time shipments are made are to be Government prices, but in the event that there are no Government prices in effect when shipments are made, then the present prices on pig iron shall apply, these being \$36.30 for Bessemer, \$33 for basic and No. 2 foundry and \$33.50 for malleable Bessemer, all in gross tons at Valley Furnace. A considerable number of blast furnaces have blown in since the coke supply became better, and last week there were only two stacks in the Youngstown district idle, Republic, Brier Hill and Youngstown sheet and tube companies having all their blast furnaces active, and the six Carnegie Steel Co. stacks at the Ohio works were in operation. In the Pittsburgh district the Carnegie Steel Co. has started seven or eight furnaces, the National Tube Co. has 9 out of 11 going, and the Jones & Laughlin Steel Co. 10 out of 11. It is estimated that the output of pig iron in the Pittsburgh and Youngstown districts combined is now on an 85 to 90 per cent basis. There is an insistent demand for prompt iron, but it cannot be had. The furnaces are making better delivery to customers, owing to opening up of the railroads, than at any time for three months or more.

We quote as follows: Basic pig iron, \$33; Bessemer, \$36.30; gray forge, \$32; No. 2 foundry, \$33; No. 3 foundry, \$32.50, and malleable Bessemer, \$33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—It is said that a fairly large quantity of open-hearth steel ingots has recently been available in the market, due to the fact that finishing mills being built by one company are not yet ready for operation and it has offered a limited quantity of open-hearth ingots for fairly prompt shipment. This is the first steel available for open market that has come out for some time. Operations among the steel mills are slowly increasing, but there is still a woful lack of cars, and a good deal is being piled on this account. Output of ingots by the Carnegie Steel Co. is now said to be between 85 and 90 per cent., the largest for several months. In the Youngstown district, Brier Hill, Youngstown Sheet & Tube and Republic companies operated their steel plants last week close to 100 per cent. If the present mild weather lasts, the railroad transportation gets better, the steel mills expect to make the heaviest output of steel in March that they have had since early last fall. The Government demands for open-hearth steel are getting steadily heavier. Two mills in the Youngstown district are said to be giving a good deal more than 75 per cent

of their total output to the Government, and in doing this are keeping some finishing mills idle for lack of steel. None of the consumers has any large stock of steel ahead, shipments of the mills being greatly delayed, and occasionally sheet and tin-plate mills have to shut down for a day or two, waiting for steel to arrive.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$47.50, sheet bars \$51, forging ingots \$73, and forging billets \$60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Steel Rails.—Mills rolling light rails report demand from the coal mining interests as very heavy, much beyond their ability to supply as promptly as needed. The lumber interests are also sending out more inquiries for light rails, and mills are sold up for months ahead, both on new light rails and rerolled rails. Nothing is being done in standard sections beyond a few small sales of a few hundred tons that a mill might be able to work in aside from its regular rolling schedules. The Government price on light rails rolled from billets is \$3 per 100 lb. for 25 to 45 lb. sections.

Ferroalloys.—There is still a fairly active inquiry for ferromanganese for last half of the year delivery from consumers working on Government orders and who desire to be covered on ferromanganese to avoid any possible interruption in operations. Recently several sales of 80 per cent domestic ferromanganese were made for second-half delivery at \$250 per gross ton delivered. Two inquiries are reported in the market for 50 per cent ferrosilicon for last half of the year delivery, one of these being for 1000 tons and the other for 500 tons. We quote 80 per cent domestic ferromanganese at \$250 per gross ton delivered, 50 per cent ferrosilicon at \$165 to \$170 delivered, and 18 to 22 per cent spiegeleisen at \$60 per gross ton at furnace.

We now quote 9 per cent Bessemer ferrosilicon at \$54, 10 per cent \$55, 11 per cent \$58.30, 12 per cent \$61.60. We quote 6 per cent silvery iron \$40, 7 per cent \$42, 8 per cent \$44.50, 9 per cent \$47, 10 per cent \$50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of \$2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—The amount of new work coming out, aside from Government contracts is still very light. The McClintic-Marshall Co. is furnishing 1400 tons of fabricated steel for new buildings for the Mesta Machine Co. at Mesta, and the Jones & Laughlin Steel Co. has taken 770 tons for a new boiler shop for the Pennsylvania Lines West at Columbus, Ohio. The Pittsburgh & Lake Erie has an inquiry for a new round house and other smaller buildings at McKees Rocks, Pa. Railroads are placing small orders for bridge work, but nothing large is expected from the railroads, unless the Government should start an active campaign of new and repair work. While this is expected, nothing official about it has been given out. We quote beams and channels up to 15 in. at 3c. at mill.

Plates.—Government requirements of plates are getting heavier, and two leading mills are giving probably 90 per cent or more of their total output of plants to Government work. There is a heavy inquiry for plates from the general trade, but only a very few of the mills have any to offer for delivery within three months or longer. New inquiries for cars are very light and the Standard Steel Car Co. and the Pressed Steel Car Co. in this city are running their plants nearly entirely on Government work. It is said that a large quantity of plates is still lying at seaboard to be exported but with little chance of getting bottoms and these plates may be turned back and sold to domestic users. A determined effort is being made by some mills to have the price of plates advanced by the War Munitions Board on March 31. It is said one large Eastern plate mill claims its cost on plates is \$3.85 per 100 lb. and unless the price is increased it will have to close its plate mills. We quote ¼-in. and heavier sheared plates at \$3.25 at Pittsburgh.

Sheets.—The American Sheet & Tin Plate Co. has authorized its sales agents to take orders for galvanized sheets for second-quarter delivery, but to sell only such quantities as were allotted to them by the company some time ago. Reports are still current of a very large order for No. 22 gage corrugated sheets to be placed

by the Government very soon, and to be used in building hangars in France, but no details are available. The Government is a persistent buyer of black and galvanized sheets in fairly large quantities, but the demand from the general trade is quiet. Consumers are well covered for some time, and owing to slack operations, mills are sold up practically over second quarter, and are more concerned in trying to get shipments to customers on orders already booked, than they are in trying to obtain new business. The output of sheets for some time has not been above 40 per cent of normal. It is not believed any revision in prices will be made on sheets on March 31. Shipping conditions are slightly better on material that has been loaded on cars for some time and which have been moved out, but the shortage in supply of cars is almost as serious as at any time. Prices on sheets are given in detail on page 585.

Wire Products.—Operations among the wire and wire nail mills are slightly better, and are now said to be close to a 75 per cent basis. However, two mills in this district that are very short of steel are not running more than 50 per cent. Government demand for wire and wire nails has quieted down a good deal, and the demand from the general trade is only fair. Mills are much behind in deliveries on contracts, owing to the heavy loss in output during the extreme cold weather, and also because they had to shut down to some extent, waiting on cars. It is not believed there will be any revision in prices on wire products on March 31, as costs in the past three months went up very rapidly. Prices on wire products are given in detail on page 585.

Nuts and Bolts.—The demand from the general trade has been very quiet for some months, and it is said that fully 75 per cent of the output of nuts and bolts is going to the Government on direct and indirect orders. Some of the makers of nuts and bolts are not operating their plants to more than 50 per cent of capacity, on account of shortage in steel and also to heavy stocks piled up, awaiting cars for shipment. No large inquiries for nuts and bolts have come out from the Government for some time. The official discounts are given on page 585.

Rivets.—The demand from the general trade is dull, and a very large part of new business booked by the rivet makers in the past three months or more has come from the Government. Output of rivets for some time has not been more than 50 per cent of normal, due to shortage in steel and cars. We quote structural rivets at \$3.65 and cone-head boiler rivets at \$3.75 per 100 lb., Pittsburgh.

Hoops and Bands.—Makers report the demand for hoops and bands as quiet, and orders from the Government have also fallen off recently. None of the hoop and band mills is able to operate to more than 50 to 60 per cent of capacity, owing to shortage in steel. We quote steel hoops at 3.50c. and steel bands at 2.90c., extras on the latter as per the steel bar card, f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—The demand from the general trade is quiet, and Government orders have also fallen off lately. As a rule, plants making cold-rolled strip steel are not operating to more than 50 per cent of capacity, due to falling off in orders and shortage in supply of steel. It is not believed there will be any change in price on cold-rolled strip steel on March 31, and consumers seem more inclined to place orders for second quarter delivery.

We quote cold-rolled strip steel at \$6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent for cash in 10 days, when sold in quantities of 300 lb. or more.

Shafting.—Some makers report the new demand from the general trade as slightly better, but orders from automobile builders and the screw stock machine trade are quiet and much lighter than at this time last year. None of the shafting makers is operating to more than 60 per cent of capacity. Shipments are held up by shortage in cars and embargoes, and stocks of shafting held by makers are very heavy. The Government is buying freely, probably 75 per cent or more of the output of shafting being shipped on direct or

indirect Government orders. We quote cold-rolled shafting at 17 per cent off list in carloads, and 12 per cent in less than carloads, f.o.b. Pittsburgh.

Hot-Rolled Strip Steel.—The demand is only fairly active, but makers report prices firm. The Government price is \$4.50 base per 100 lb. f.o.b. Pittsburgh, but it is claimed this price is not firmly held.

Spikes.—The New York, New Haven & Hartford Railroad is reported in the market for 3000 kegs of spikes for early shipment. The demand for railroad spikes is quiet but for small spikes and boat spikes is very active. On the latter, makers report they are filled up for four to six months.

We quote standard sizes of railroad spikes, 9/16 x 4 1/4 in. and larger, at \$3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes are held at \$5.25 per 100 lb., f.o.b. Pittsburgh.

Skelp.—Makers report the demand very heavy, much beyond their ability to supply as promptly as wanted. We quote grooved skelp at \$2.90, universal skelp \$3.15, and sheared skelp \$3.25, base, per 100 lb. f.o.b. Pittsburgh.

Wrought Pipe.—Recently the price of Pennsylvania crude oil was fixed at \$4 and this high price has resulted in active developments in oil fields in Pennsylvania. Many report the pressure for delivery of oil country goods as very heavy, and say their output is under contract for all of this year. Very large projects involving gas and oil lines are under way, and there will be no trouble this year in the mills filling up their order books on line pipe, if they are able to get the steel and roll it and make the deliveries wanted. The merchant demand for iron and steel pipe is fairly heavy, and the mills have practically their entire output of lapweld products sold for this year. The demand for butt-weld pipe is only fair, and mills can ship in 8 to 10 weeks from date of order. Discounts on iron and steel pipe are given on page 585.

Tin Plate.—All the tin plate manufacturers are now making up statements of the amount of tin plate they have on hand ready for shipment, also what they expect to turn out during the next 30 days, and its destination and all this information is to be submitted to the Government at Washington in the belief that an arrangement will be made by which cars will be furnished promptly to the tin plate makers, and allow them to get shipments to can makers and also to the packers. The need of tin plate for the salmon packers on the Pacific Coast is most urgent and mills are doing all they can to have the Government give them cars to ship this plate. There is a fairly heavy demand for tin plate for export, but makers are not figuring on this, knowing that their entire output will be needed for domestic trade, and also to fill the orders for France to be placed by our Government, which may approximate 5,000,000 boxes. Operators among the tin plate mills are holding up remarkably well, considering the railroad congestion and the short supply of steel, and are given as being on about a 90 per cent basis. The demand for stock items for tin plate is active, and these are moving out freely. We quote tin plate at \$7.75 per base box, rolled from Bessemer or open-hearth stock. Prices onterne plate are given on page 585.

Iron and Steel Bars.—Mills report that inquiry from the general trade for iron and steel bars has quieted down a good deal, but owing to the great falling off in output in the past three months the mills got very far behind in deliveries and have very few iron or steel bars to offer for shipment during first half of this year. Fairly heavy orders for both iron and steel bars are being placed by the Government, but no details of these are given out. One local mill that makes a very high-grade iron bar, rolled from special stock, is said to have been selling 75 per cent or more of its output to the Government practically since the war started. Inquiries for shrapnel steel are still heavy, and one large order for steel rounds for the Government was placed with a local mill recently, and for quick delivery. Very little is being done in reinforcing bars, owing to dull building operations. We quote steel bars rolled from old steel rails at 3c., from steel billets 2.90c. and refined iron bars at 3.50c., f.o.b. Pittsburgh.

Rods.—There is an active demand for wire rods

from the general trade, and also a heavy export inquiry. Recently inquiries for rods from France, the Orient and from South America have reached local rod mills, but as a rule they refuse to quote on these, knowing the difficulty there would be in getting Government licenses and bottoms for shipments. Two local makers of rods say they have not taken any new orders for some time, diverting as much of their steel as they can to other products, and thus cutting down their output. Prices on rods are given in detail on page 585.

Boiler Tubes.—The output of iron and steel tubes and also seamless steel tubing is under contract for all of this year, and one leading maker has heavy orders on its books for delivery over first half of 1918. Discounts on iron and steel tubes are given on page 585.

Old Material.—Since the new prices and regulations were announced last Saturday by Judge Gary for the American Iron and Steel Institute Committees, very little new business has been done, dealers reporting they are giving nearly all their spare time in trying to secure shipments on scrap sold months ago and not yet delivered. Prices on iron and steel scrap, nearly all of which have been fixed by the Government, for delivery in Pittsburgh and other points that take Pittsburgh freights are as follows:

Heavy steel melting scrap, Steubenville, Folsom, Brackenridge, Monessen, Midland and Pittsburgh, delivered.....	\$30.00
No. 1 foundry cast.....	30.00
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh.....	35.00
Hydraulic compressed sheet scrap.....	\$26.00 to 27.00
Bundled sheet scrap, sides and ends f.o.b. consumers' mill, Pittsburgh district.....	24.00 to 25.00
Bundled sheet stamping scrap.....	22.00 to 23.00
No. 1 railroad malleable stock.....	30.00
Railroad grate bars.....	19.00 to 20.00
Low phosphorus melting stock.....	40.00
Iron car axles.....	47.50
Steel car axles.....	47.50
Locomotive axles, steel.....	47.50
No. 1 bushing scrap.....	27.00 to 28.00
Machine shop turnings.....	20.00
Cast iron wheels.....	30.00
Rolled steel wheels.....	35.00 to 37.00
*Sheet bar crop ends.....	39.00 to 40.00
Cast iron borings.....	20.00
No. 1 railroad wrought scrap.....	35.00
Heavy steel axle turnings.....	25.00 to 26.00
Heavy breakable cast scrap.....	30.00

*Shipping point.

Coke.—Shipping conditions in the coke trade were better last week than at any time for probably four months. The supply of cars averaged 65 to 70 per cent, some coke works reporting close to a 100 per cent supply for several days. The first free coke in a long time came out last week, about 30 cars, and was promptly sold to a consumer at the regular price of \$6 per net ton at oven. It is believed that transportation and operating conditions in the coke trade will continue to steadily improve as long as the present mild weather lasts. Output of coke in the upper and lower Connellsville regions for the week ending Feb. 16 was 240,772 an increase of 16,627 tons over the previous week. The output of coke is expected to get heavier right along. We quote 48-hr. blast furnace coke at \$6, 72-hr. foundry coke at \$7, and crushed coke from 1-in. size at \$7.30 per net ton at oven.

Chicago

CHICAGO, Feb. 26—(By Wire).

No developments of a striking character have come to light. The mills and manufacturers generally are doing better in the matter of production, except in the case of an East Chicago bar-iron mill, which for some strange reason had its coal supply cut off entirely. As a result it will be down for the week. The leading interest is producing on a better scale, though still considerably under normal. The leading local independent is operating 85 to 90 per cent. The general basis of operations is below normal, but the situation is encouraging. The steel trade is giving much consideration to the possibility of price revision at the end of the quarter, the general sentiment being that prices should be left alone so long as the public is willing to buy. The prospect of a change has unsettled both consumers and makers, and the trade wants peace.

Exports of bars and sheets are temporarily stopped because of the license requirement, the mills waiting until their customers, the exporters, obtain the necessary permits. The demand for plates entitled to preferential delivery is steadily expanding and bringing despair to some producers. They cannot give first preference to every order. The pig-iron demand continues active, with consumers becoming a little excited. Stack No. 4 of the Iroquois Iron Co., which was out for relining, was blown in Feb. 23. The company's new stack, No. 5, probably will be fired the first week in March. The new schedule of old-material prices is not yet digested, but the indications are it will be accepted gracefully. It is more specific than the old one and will work better.

Pig Iron.—Not only does the inquiry for pig iron continue heavy but consumers are showing a tendency to become excited. Northern furnaces are still booking orders for the last half, but selling to selected customers only, and then in quantities dictated by their judgment. Although it has been understood that all warrant iron had been absorbed, a little business in No. 3 foundry warrant iron has been done. The heaviest inquiry is for malleable, although the demand for foundry grades has been heavy also. Some business has been done also in iron 4 per cent and over in silicon, of which a Southern producer of foundry iron is practically out of the market for the first half, and for the second half is selling only moderate-sized lots of standard No. 2 foundry. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5.....	\$37.50
Lake Superior charcoal, No. 6 and Scotch.....	40.00
Northern coke foundry, No. 1.....	33.50
Northern coke foundry, No. 2.....	33.00
Northern coke foundry, No. 3.....	32.50
Northern high-phosphorus foundry.....	33.00
Southern coke No. 1 foundry and No. 1 soft.....	38.50
Southern coke No. 2 foundry.....	37.00
Malleable Bessemer.....	33.50
Basic.....	33.00
Low phosphorus (copper free).....	53.00
Silvery, 7 per cent.....	44.54

Ferroalloys.—Eighty per cent ferromanganese is firm, but rather quiet at \$250 delivered. Inquiry is being made for 50 per cent ferrosilicon, the quotation for which is around \$190 delivered.

Plates.—At no time has the situation in plates been tighter than it is at present. Meanwhile the demand is steady and insistent. Local mills have been called on for thousands of tons for ship construction which they are unable to supply. Inquirers have been sent to the mills by Washington officials and instructed to ask for preferential deliveries. The trouble is that practically all of the tonnage now booked is subject to preference. Even narrow widths are difficult, if not impossible, to obtain from the mills. The leading independent received orders to-day from the Government aggregating 7000 tons of plates and shapes. It is not taking any domestic business. The mill quotation is 3.25c. Jobbers quote 4.45c. for material out of warehouse.

Bars.—A few steel bars are being placed, mostly for Government and agricultural implement use. The export of bars has temporarily ceased because of the export license requirement. The makers of steel bars are not disposed to sell until they know what the second quarter price will be. Both iron and rail carbon bars are quiet, with iron the more active of the two. An East Chicago bar mill is down and probably will be idle all this week because of interference with its coal supply by the Fuel Administration. The re-rolling mills are short of old steel rails. We quote mild steel bars at 2.90c.; rail carbon at 3c., Chicago and common iron bars at 3.50c. Chicago warehouse prices follow:

Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c., base, with 5c. extra for twisting sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Structural Material.—Large tonnages continue to be taken for shipbuilding. The car business is confined to small odd lots. The American Bridge Co. will fabricate 2710 tons to enter three new buildings to be added to

the Hawthorne plant of the West Electric Co., Chicago. The Pacific Rolling Mill Co. will fabricate 183 tons for a bridge over the Eel River at Alderpoint, Humboldt County, Cal. The mill quotation is 3c. and the warehouse quotation for material out of stock 4.20c.

Rail and Track Supplies.—Scattered inquiry for rails continues to come out, but with the mills sold ahead for the year and far behind in deliveries. Not much business results. Small lots of track fastening urgently required are being placed. We quote:

Standard railroad spikes, 4.11½c., Chicago. Track bolts, with square nuts, 5.11½c., Chicago. Tie plates, 3.25c., f.o.b. maker's mill. The base for light rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Sheets.—Most domestic consumers appear to be pretty well covered so far as their immediate requirements are concerned. The makers have few to sell for the quarter and in view of uncertainty over second-quarter prices are not selling into that period. Sheets should become more plentiful in view of the Government's restriction of exports. We quote No. 10 blue annealed at 4.25c.; No. 28 black at 5c. and No. 28 galvanized at 6.25c.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c., and No. 28 galvanized, 7.70c.

Wire Products.—Production is at a better rate, but still considerably under normal. The demand for fencing from the Northwest is poor, because of the failure of spring wheat in that territory last year, but the business from other sections more than makes up the deficiency. We quote Government levels as follows:

Nails, \$3.50. Pittsburgh: plain fence wire, \$3.25; painted barb wire, \$3.65; galvanized barb wire, \$4.35; polished staples, \$3.65, and galvanized staples, \$4.35.

Old Material.—The market has been a little more active as regards inquiry, sales and shipment in the past week. It is a little too early to predict how the new schedule will work out. In a few cases what appear to be inconsistencies are pointed out, but acceptance of the arrangement promises to be more graceful than was the case with the first promulgation of official prices. The new announcement enables cast scrap to sell higher than pig iron and puts short rails and rerollers at the same level. By one or two consumers it is believed that inferior grades are given undue importance. The Rock Island and C. B. & Q. have issued lists. We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$38.00 to \$39.00
Relaying rails	60.00
Old carwheels	30.00
Old steel rails, rerolling	35.00
Old steel rails, less than 3 ft.	35.00
Heavy melting steel	29.50 to 30.00
Frogs, switches and guards, cut apart.	29.50 to 30.00
Shoveling steel	29.00 to 29.50
Steel axle turnings	25.50

Per Net Ton	
Iron angles and splice bars	\$35.72
Iron arch bars and transoms	\$39.00 to 40.00
Steel angle bars	30.50 to 31.00
Iron car axles	42.41
Steel car axles	42.41
No. 1 railroad wrought	31.25
No. 2 railroad wrought	30.00 to 30.50
Cut forge	29.50 to 30.00
Pipes and flues	24.00 to 24.50
No. 1 busheling	26.00 to 26.50
No. 2 busheling	18.25 to 18.75
Steel knuckles and couplers	31.25
Coil springs	31.25
No. 1 boilers, cut to sheets and rings.	22.00 to 23.00
Boiler punchings	32.00 to 33.00
Locomotive tires, smooth	36.50 to 37.50
Machine-shop turnings	16.50 to 17.00
Cast borings	16.25 to 16.75
No. 1 cast scrap	26.75 to 27.75
Stove plate and light cast scrap	22.50 to 23.00
Grate bars	22.00 to 23.00
Brake shoes	24.00 to 25.00
Railroad malleable	26.80
Agricultural malleable	25.75 to 26.25
Country mixed scrap	20.00 to 22.50

Cast-Iron Pipe.—Business continues light, with several awards delayed. Manitowoc, Wis., will take bids, March 2, on 90 tons, and Saginaw, Mich., March 5, on 135 tons. Sioux City, Iowa, opened bids on 650 tons Feb. 23, but has not made the award.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., \$57.30; 6-in. and larger, \$54.30, with \$1 extra for Class A water pipe and gas pipe.

Bolts and Nuts.—The situation is without change, and getting raw material is still the big problem of the manufacturers. For prices and freight rates see finished iron and steel, f.o.b. Pittsburgh. Jobbers quote as follows:

Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ¾ x 4 in., 40 and 10 per cent off; larger sizes, 35 and 5 off; carriage bolts up to ¾ x 6 in., 40 and 2½ off; larger sizes, 30 and 5 off; hot pressed nuts, square tapped, \$1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 50 per cent off.

Philadelphia

PHILADELPHIA, Feb. 26.

Operating conditions at eastern Pennsylvania steel plants show an improvement as a result of a slightly better coal supply. Estimated production this week is on a 50 to 60 per cent basis, as compared with about 40 per cent a week ago, and there is hope for still further improvement if no more severe storms interfere with railroad transportation. Coke shipments have not shown as great an improvement as coal, and blast furnace operations average less than 50 per cent of capacity in this district. The Bethlehem Steel Co. today had 12 of its 23 blast furnaces in operation, but some other iron producers could not show as good a record. The Pennsylvania Railroad still has its embargo in effect, but it is now considerably less difficult to obtain permits. Pig iron, steel and scrap are moving with greater freedom. Floods along the Susquehanna River have curtailed shipments to the districts affected, but in other sections of this territory the railroads are gradually straightening out the tangle of freight.

Coke.—A leading seller of coke in this market has accepted contracts for a fairly large tonnage of foundry coke for delivery in the second half. Only customers whose orders were on the books for first half shipment have been favored. Prompt coke is still unobtainable. Shipments are restricted by a shortage of box cars.

Ferroalloys.—Ferromanganese is firm at \$250, delivered, for the 80 per cent. There are inquiries in the market aggregating 2000 to 3000 tons, the largest single inquiry reported being for 600 tons. Spiegeleisen is holding at \$60, furnace, for the 20 per cent.

Pig Iron.—There has been very little selling of pig iron in this market during the past week. Except for the sale of small lots of prompt iron, mostly off grades, business is almost at a standstill. As reported last week, a large quantity of iron could be sold for second half, if furnaces were willing to commit themselves, but inquiries are generally being turned down with the explanation "We do not want to sell iron until we know whether we will be able to make it." The American Bridge Co. has not succeeded in obtaining basic iron for second half in this market. As this company is not a buyer of merchant iron in normal times, it is finding difficulty in persuading furnaces to sell iron which the makers prefer to sell to their old customers. Reports of various lots of iron held in storage for export are heard here, and a considerable tonnage of such iron would find its way into the market, were it not for the price restrictions. A 1000-ton lot of standard low phosphorus iron could be had at \$90, the price at which it was bought, but, of course, no one is willing to violate the Government price edict by buying at more than \$53. Another lot of iron is held at an Atlantic port for shipment to Norway, but it cannot be shipped. The shipper has paid freight charges to destination, storage charges, etc., and the present cost of the iron is in excess of \$100 a ton. The owner is not willing to sell at the Government price and pocket a big loss, so the iron remains in storage. A large tonnage of Bessemer iron is being held at a New Jersey furnace for shipment to the Italian Government, but shipping space cannot at present be obtained. In view of the great shortage of iron, it is suggested by a pig-iron man here that the Government should commandeer all iron held in storage, pay the fixed price and advise the owners to commence suit for the remainder. Very little Southern iron is coming into this territory, much to the regret of con-

sumers, who have expected that that source of supply might become available when Eastern furnaces were no longer able to supply the demand. Among the inquiries being figured upon here is one from a St. Louis company for 20,000 tons of basic for delivery over the last half. We quote standard grades of iron f.o.b. furnace as follows, except Virginia iron, for which the delivered prices are quoted:

Eastern Pennsylvania No. 1 X.....	\$34.50
Eastern Pennsylvania No. 2 X.....	33.50
Eastern Pennsylvania No. 2 foundry.....	33.00
Virginia No. 2 X (including freight).....	36.77
Virginia No. 2 foundry (including freight).....	36.27
Basic.....	33.00
Gray forge.....	32.00
Bessemer.....	36.30
Standard low phosphorus.....	53.00
Low phosphorus (copper bearing).....	50.00

Billets.—No sales of billets are reported in this market. There is a large demand for forging billets. We quote 4 x 4-in. soft steel billets at \$50.50, Philadelphia.

Old Material.—A better feeling among scrap dealers has resulted from the announcement of new prices governing the sale of such material. These prices, which were recommended by the Sub-Committee on Iron and Steel Scrap and approved by the Committee on Steel and Steel Products of the American Iron and Steel Institute, are published elsewhere in this issue. They became effective on Feb. 21. There has been a slight resumption of buying by consumers and a fairly good business has been done with brokers who need material to fill old orders. The market is not yet on a normal basis, but will probably gradually become more active as the new regulations become better known by buyers and sellers. Eastern Pennsylvania steel plants will buy heavy melting steel at \$30, delivered, but do not need scrap badly enough at present to pay the 3½ commission. A quickened demand from the Pittsburgh district is expected shortly. The movement of scrap is better as the railroads are getting rid of the chaotic conditions which have prevailed. All shipments over the Pennsylvania lines are on permits, and this method of regulating traffic will probably prevail until conditions become more nearly normal. We quote the following prices for delivery f.o.b. consuming point:

No. 1 heavy melting steel.....	\$30.00
Steel rails, rerolling.....	35.00
Low phosphorus heavy, 0.04 and under.....	\$37.50 to 40.00
Low phosphorus (not guaranteed).....	35.00
Old iron rails.....	40.00 to 42.00
Old carwheels.....	30.00
No. 1 railroad wrought.....	35.00
No. 1 yard wrought.....	34.00
Country yard wrought.....	30.00
No. 1 forge fire.....	26.00 to 28.00
Bundled sheets.....	26.00 to 28.00
No. 1 busheling.....	32.00
No. 2 busheling.....	17.00 to 18.00
Turnings (for blast furnace use).....	17.50 to 18.00
Machine shop turnings (for rolling mill use).....	18.50 to 19.50
Cast borings (for blast furnace use).....	17.50 to 18.00
Cast borings (clean).....	20.00
No. 1 cast (for steel plant use).....	30.00
No. 1 cast (cupola sizes).....	35.00
Grate bars.....	23.00 to 24.00
Stove plate.....	23.00 to 24.00
Railroad malleable.....	29.00 to 30.00
Wrought iron and soft steel pipes and tubes (new specifications).....	34.00
Ungraded pipe.....	30.00

Finished Iron and Steel.—Owing to the greatly curtailed production of the past few months, steel companies are not greatly interested in new business. A fairly large number of inquiries, some of them for export, have been received during the past week. Plate makers are forced to turn down many inquiries, as it will require at least two or three months to make up for lost time on Government orders. Some small lots of shapes are being bought, mostly 50 tons and under, and there are indications of a slight revival in building operations, such buildings being mainly factory extensions or other work which is due to increasing capacity for war orders. No action has yet been taken on the 3050 portable hangars for shipment to France, 2000 of which will probably be bought for the United States Signal Corps and 1050 for our Allies. As a rule, sheet makers are declining to quote, though an order of desirable sizes can occasionally be squeezed in. Domestic business in steel bars is quiet, but there are a few

inquiries for export, notably one for 1200 tons of reinforcing bars. A small business is being done by bar iron makers, due largely to decrease in production and shipping difficulties. We quote plates at 3.25c., plain material at 3c., soft steel bars at 2.90c., Pittsburgh, and bar iron at 3.685c., Philadelphia. No. 10 blue annealed sheets are 4.25c., No. 28 black are 5c. and No. 28 galvanized are 6.25c., Pittsburgh.

Cleveland

CLEVELAND, Feb. 26—(By Wire).

Iron Ore.—The rider that will be included in Lake Superior iron ore contracts this season, making prices subject to Governmental revision, has been adopted, and is being delivered in printed form to the ore firms. Various provisions were suggested, but the clause as decided upon is rather brief, merely providing that should the Government make any changes in prices, either higher or lower, the price stipulated in the contract shall be changed to conform to the maximum Government price that is in effect at the time of shipment. Sellers will now go ahead and convert into contracts at the 1917 prices large reservations that have been made. Should prices be changed by the Government during the year, the new prices will apply to all ore that has not been shipped under the contracts at the time the revision is made. Prices lower lake ports follow:

Old range Bessemer, \$5.95; old range non-Bessemer, \$5.20; Mesaba Bessemer, \$5.70; Mesaba non-Bessemer, \$5.05.

Pig Iron.—There is still a great deal of inquiry for pig iron, mostly for foundry grades for the last half delivery, but there is very little available. One Cleveland foundry is still able to take care of the demand of its foundry trade, but has no basic iron for sale, and other producers in this territory have very little iron left. No additional Government inquiries have developed, but a leading carwheel manufacturer is inquiring for 17,000 tons of malleable iron, 15,000 for its western plants and 2000 for the East for March-June delivery, and has asked the assistance of the Government in securing this iron. Two northern Ohio steel plants have succeeded in securing some additional basic iron and are now fairly well covered for their last half requirements. No new basic inquiries have come out, but some consumers have as yet been unable to satisfy their demands. The increased consumption of basic iron in the northern Ohio territory due to the greater open-hearth capacity has curtailed the production of other grades, and it is expected that Cleveland foundries will experience a serious shortage during the last half. A few sales of southern iron are reported, but two southern sellers who have been active in this territory have sold so much tonnage that they have withdrawn from the market. We quote f.o.b. Cleveland:

Bessemer.....	\$37.25
Basic.....	33.30
Northern No. 2 foundry.....	33.30
Southern No. 2 foundry.....	37.00
Gray forge.....	32.30
Ohio silvery, 8 per cent silicon.....	46.12
Standard low phosphorus, Valley furnace.....	50.00

Finished Iron and Steel.—The demand for plates is more active than other lines of finished steel. Oil companies wish to add to their field tank capacity, providing they can secure the steel. One Ohio tank shop is inquiring for 3000 tons of plates for this purpose, and other inquiries for similar work aggregate several thousand tons. The Toledo Shipbuilding Co. has taken four boats for the Emergency Fleet Corporation, in addition to four recently noted, and is inquiring for about 10,000 tons of plates for these ships. A Cleveland mill has taken approximately 13,000 tons of light plates for 200-ft. submarine fighters to be built by the Ford Motor Co. There are numerous small lot plate inquiries for Government work. The Chandler Motor Car Co., Cleveland, has taken a large order for caterpillar tractors for the Government, which will require a large tonnage of steel, and will erect a new building for this work that will take 320 tons of structural material. The White Co., Cleveland, has placed 500 tons with the King Bridge Co. for a plant addition. There is considerable demand for forging steel, mostly for Govern-

ment work. Some mills making shell steel are accumulating a large stock of discard, and hope to work this off in the form of hard steel bars, but the demand for these bars is light at present. Producers not having finishing mills are disposing of some of this discard in the form of billets to re-rolling mills, which are substituting it for old steel rails. These billets are bringing \$45 to \$50 a ton, according to size. The scarcity of sheet bars has not been relieved, and one northern Ohio mill will shut down shortly unless it can obtain Government orders, so that it will be assured a supply of semi-finished steel. The demand for sheets continues active. Considerable export tonnage in blue annealed sheets has been released because of the understanding by some of the mills that material under $\frac{1}{4}$ in. in thickness for export to neutral countries is no longer exempt from license requirements. This material is being quickly absorbed by the domestic trade. The demand for bar iron is inactive.

We quote warehouse prices as follows: Steel bars, 4.03 $\frac{1}{2}$ c.; plates, 4.38 $\frac{1}{2}$ c.; structural material, 4.13 $\frac{1}{2}$ c.; No. 10 blue annealed sheets, 5.35c.; No. 28 black sheets, 6.35c.; No. 28 galvanized sheets, 7.60c.

Coke.—The coke situation in respect to deliveries has improved materially during the past week, and foundries that have been running very short are now fairly well supplied. Coke shipments to blast furnaces have also improved, and a further change for the better is expected this week. Because of the scarcity of foundry coke, one Cleveland foundry is inquiring for its requirements of several hundred tons for the year 1919.

Bolts, Nuts and Rivets.—The demand from the Government for bolts and nuts is very heavy, and a number of orders aggregating several million bolts and nuts were placed by various departments in Washington during the week. The inquiry from the Quartermaster's Department for 55,000,000 bolts and nuts is still pending. The demand for rivets from Eastern shipyards is heavy, and several large orders were placed during the week. Three of these aggregating 1500 tons were taken by a Cleveland rivet manufacturer.

Old Material.—The readjustment of scrap prices has had practically no effect on the Cleveland market, but some criticism is heard among dealers because any change was made at the present time instead of waiting until April 1. Scrap brokers are being seriously affected by the Government regulation regarding commissions. A fair volume of business is being placed, but the bulk of the sales are being made directly by producers to consumers. Some of the yard dealers are also selling directly to the consumers instead of through the brokers. Considerable of the railroad scrap is also being sold directly to the consumers. Many producers have large tonnages of scrap sold some time ago, which they have not yet been able to ship, and will not take additional orders until they get this material cleaned up. Owing to the improvement in the transportation situation scrap is now moving very freely. The reduction of \$3 a ton on busheling scrap in the new prices is received with satisfaction, as the trade has always regarded the former \$35 price as entirely too high, and most sales have been made at around \$5 or more below that price. Busheling is still quoted below the new Government price, but this grade is inactive, as mills are well supplied. Other grades are selling at the Government prices. We quote f.o.b., Cleveland, as follows:

Per Gross Ton	
Steel rails	\$27.00 to \$28.00
Steel rails, rerolling	35.00
Steel rails, under 3 ft.	35.50
Iron rails	40.00
Iron car axles	47.50
Steel car axles	47.50
Heavy melting steel	30.00
Cast borings	20.00
Iron and steel turnings	20.00
No. 1 railroad wrought	35.00
Hydraulic compressed steel scrap	29.00 to 30.00
Cast iron car wheels, unbroken	30.00
Cast iron car wheels, broken	35.00
Agricultural malleable	24.00 to 25.00
Railroad malleable	35.00
Steel axle turnings	25.00
Light bundled sheet scrap	24.50 to 25.00
Cast iron scrap	30.00
Cast iron scrap, broken to cupola sizes	30.00
No. 1 busheling	30.00
Per Net Ton	
Railroad grate bars	\$20.00 to \$21.00
Stove plate	20.00 to 21.00

Cincinnati

CINCINNATI, Feb. 26—(By Wire).

Pig Iron.—Southern Ohio furnaces are practically out of the running as far as foundry iron is concerned for any shipment this year. The production in the Hanging Rock district has been cut down materially, on account of both labor and coke shortages, that have now only been relieved to a limited extent. With two exceptions, all producers in the South are selling iron for last-half shipment, and some comparatively heavy sales were made last week, included in which was some high silicon iron. Local melters of foundry iron purchased heavily all during February, and sales were also made in northern Ohio, Indiana and southern Michigan. Very little prompt or second-quarter business is reported, although there is some standard Southern iron that could be shipped in the second quarter. This would indicate that melters generally have a sufficient supply to carry them until July 1. The apprehension as to a readjustment of prices April 1 does not seem to deter buyers in covering for their last-half requirements. Some trouble is experienced by operators of stove foundries in fixing future prices on their finished product, but, as the general belief is that no radical changes will be made, the present price on iron, \$33 furnace, is used in computing costs. The production of iron is now gradually increasing in all districts, due to some improvement in coke shipments, but unless the labor shortage is relieved the normal production cannot soon be reached in any district. The inquiry for Southern iron is holding up well, but there is no interest taken in Northern grades, as consumers understand that the furnaces are not taking on any business at the present time. Based on freight rates of \$2.90 from Birmingham and \$1.26 Iron-ton, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 2 foundry and No. 2 soft..\$35.90
Southern Ohio, No. 2..... 34.26
Basic, Northern..... 34.26

Finished Material.—The jobbers report shipments from the mills as being heavy at the present time and some of them have been able to add materially to stocks on hand. This almost sudden improvement in mill shipments is in some quarters attributed to what seems to be the custom lately of supplying one district at a time. Outbound shipments are almost impossible to make except to some southern points. However, shipments to some stations on the Baltimore & Ohio Railroad have been taken lately, and it is hoped that the embargoes existing on other lines will be raised at an early date. Jobbers handling machine shop supplies claim that business is on the mend and the demand for high speed steel also shows considerable improvement. The manufacturer's base price on high speed steel remains at \$2 per pound for leading brands. Sheet metal contractors state that they are unable to buy any black or galvanized sheets for prompt shipment from the mills and that all urgent orders now have to be placed with the jobbers.

Jobbers' prices are unchanged as follows: Iron and steel bar, 4.08 $\frac{1}{2}$ c.; twisted bars, $\frac{3}{4}$ x 1 $\frac{1}{4}$ -in., 4.23 $\frac{1}{2}$ c.; $\frac{3}{4}$ -in., 4.33 $\frac{1}{2}$ c.; $\frac{1}{2}$ -in., 4.43 $\frac{1}{2}$ c.; $\frac{3}{8}$ -in., 4.63 $\frac{1}{2}$ c.; and $\frac{1}{4}$ -in., 4.88 $\frac{1}{2}$ c. Structural shapes are quoted at 4.18 $\frac{1}{2}$ c.; plates, $\frac{1}{4}$ -in. and heavier, 4.43 $\frac{1}{2}$ c.; No. 10 blue annealed sheets, 5.43 $\frac{1}{2}$ c. Cold rolled shafting is sold at 10 per cent discount. The mill price on No. 28 black sheets is 5.18 $\frac{1}{2}$ c., and No. 28 galvanized 6.43 $\frac{1}{2}$ c.

Coke.—The latest Government schedule places the price of New River coke at \$8 per net ton at oven. It is understood that this figure is named on both 48-hr. and 72-hr. grades. Other changes made affect only prices on some Southern coke. It was currently reported that Wise County coke was included, but this does not appear to be true. Although it is stated that production in all districts is now on the increase and that the car situation shows some improvement, there is still a shortage of fuel that curtails the production of pig iron and also the operation of many foundries in this vicinity. The labor supply is totally inadequate and there does not seem to be any chance for any improvement on this score at an early date. Probably a little better coke is being made now than at this time last month, but most of it is yet running too high in sulphur. The Connelville district is leading in shipments and probably

more cars are going forward from that field than from the Wise County, Pocahontas and New River districts combined.

Old Material.—Business is reviving slowly, as railroad embargoes have not yet been raised on shipments intended for Pittsburgh and Cleveland territory. Only a few rush orders have been moved lately eastward, and as a consequence transactions have been very much limited. The maximum prices named by the Government have not yet been firmly established on some grades of scrap, but as soon as business becomes more normal, the entire schedule will doubtless be adopted promptly. Low-phosphorus scrap is very much in demand for future shipment, but only a few sales are reported. The following are dealers' prices, f.o.b. southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap.....	\$19.00
Old iron rails.....	\$32.00 to 32.50
Relaying rails, 50 lb. and up.....	44.00 to 44.50
Rerolling steel rails.....	33.00 to 33.50
Heavy melting steel scrap.....	27.00
Steel rails for melting.....	27.00 to 27.50
Old carwheels.....	28.00
Per Net Ton	
No. 1 railroad wrought.....	\$29.00 to \$29.50
Cast borings.....	14.00 to 14.50
Steel turnings.....	14.00 to 14.50
Railroad cast.....	24.50 to 25.00
No. 1 machinery.....	25.00 to 25.50
Burnt scrap.....	16.50 to 17.00
Iron axles.....	40.00 to 40.50
Locomotive tires (smooth inside).....	33.50 to 34.00
Pipes and flues.....	19.00 to 19.50
Malleable cast.....	24.00 to 24.50
Railroad tank and sheet.....	17.00 to 17.50

Birmingham

BIRMINGHAM, ALA., Feb. 26.

Pig Iron.—The market in the South is still satisfactory for the furnace companies, which are able to book all the business they want, for delivery the last half of the year. There is inquiry yet for iron for the second quarter, but regular customers only are being accommodated and these will shortly be denied. The business already booked for delivery during the last half of the year is large. The sales now more than equal the make while deliveries are also exceeding the output at the furnaces. This means there is further reduction of all iron on furnace yards. While the home melt is somewhat under what it has been, caused by the shutting down of a cast iron pipe plant on account of the strike of metal workers, molders, machinists, pattern makers and others who seek an 8-hour day, and also the shutting down of a foundry and machine shop or two, there is need for the product elsewhere. Efforts to increase the make in the South will be realized next month, as the Trussville furnace will be ready the latter part of next month and the two Sheffield furnaces sooner. Good weather has brought about a general change in conditions, a steadier supply of raw material and better transportation in the district. Sales are still in small lots and purchasers care not for any possible revision in prices by the Government. The iron market, of course, had to take some notice of the labor troubles of the Birmingham district, which included cessation of work for several days on the part of employees of the Tennessee Coal, Iron & Railroad Co. and the Republic Iron & Steel Co., and the metal trades workmen.

Coal and Coke.—The coal and coke production in Alabama has been affected but slightly, everything considered, by the stopping off from work for several days by employees of the Tennessee Coal, Iron & Railroad Co. and the Republic Iron & Steel Co., who complain of a non-compliance with the Garfield agreement for operators and employees in Alabama. The United Mine Workers have asked that Rembrandt Peale, of the Fuel Administration office be sent here for a full investigation into the situation. Judge H. C. Sellheimer, a well known attorney, has been appointed as umpire in this district to hear disputes and settle them, if possible. Independent coal and coke producers are doing as well as could be expected.

Scrap Iron and Steel.—The old material market in the South shows some improvement and there is confidence expressed by the dealers following an upward revision on products by the Government. Heavy melting

steel has been selling in the Birmingham district as high as \$27.50 per ton. The difference in price, local and Government, is accounted for in the fact that the grading is not so particular in this section as elsewhere. With removal of embargoes and improvement in the railroad situation, expectations are that dealers can get some large orders. Closing down of the cast iron pipe plant at Bessemer of the United States Cast Iron Pipe & Foundry Co. has been felt and other pipe plants in this district are buying scrap carefully, the pipe trade being so quiet that there is probability of the production being further curtailed. The quotations for scrap iron and steel are as follows, in the South:

Old steel axles.....	\$32.00 to \$33.00
Old steel rails.....	28.00 to 30.00
Heavy melting steel.....	25.00 to 27.50
No. 1 R. R. wrought.....	27.00 to 30.00
No. 1 cast.....	25.00 to 26.00
Old carwheels.....	25.00 to 30.00
Tramcar wheels.....	21.00 to 25.00
Machine shop turnings.....	17.50 to 19.00
Cast iron borings.....	13.00 to 15.00
Stove plate.....	19.00 to 21.00

British Steel Market

Stringency Less in Hematite Iron—Tin Plates Firmer—Ferromanganese Sold at \$250

(By Cable)

LONDON, ENGLAND, Feb. 27.

The stringency in hematite iron is somewhat relaxed. American wire rods are nominal. Tin plates are firmer at 31s. 10½d. Ferromanganese is firm with \$250 c.i.f. paid for forward shipment to North Atlantic ports. We quote as follows:

Tin plates coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 31s. 10½d.

Ferromanganese, \$250, c.i.f. for export to America; £26 10s. for British consumption.

Ferrosilicon, 50 per cent, c.i.f. £35 upward.

On other products control prices are as quoted in THE IRON AGE of July 19, 1917, p. 171.

Large Tin-Plate Exports to France—American Steel Shipments Much Behind Contract

LONDON, ENGLAND, Jan. 29.—(By Mail).—There have been indications of rather more stringent conditions from raw to finished material, but only few new features have been disclosed lately. National requirements of course absorb chief attention and the placing of orders for surplus material for non-essential work is extremely difficult.

The pig iron position is fundamentally unchanged, but remains unsettled, because of the absence of any official statement regarding subsidies to furnace owners against increased costs. Midland ironmasters are straining every nerve to keep up with their current engagements while anxious to avoid taking of new orders. Inquiries from Allies made in that district could not be entertained, for home orders, where taken at all, are being cut down and subject to constant delays. There is a brisk demand for Scotch iron, particularly hematite, needs in the north being heavy. There is intense pressure of deliveries of Cleveland foundry grades, users being fidgety as to deliveries because of car shortage, and the resultant accumulation at makers' yards is causing inconvenience. Shipments to the Allies are much in arrears, October contracts being still held up by tonnage scarcity. The basic iron output is being increased further owing to urgent demands from steel works, but that of hematite is hindered by the tightness of the ore position. Blast furnace ferrosilicon is unchanged and spiegeleisen, 22 to 23 per cent, is quoted £15 3s. f.o.b. Liverpool.

There is no change in semi-finished steel. There is not the least prospect of any relaxation of the phenomenal stringency, although the official quotation of Welsh sheet bars and billets is still retained at £10 7s. 6d. net f.o.t. Limited quantities of American material have come in lately against much overdue contracts, but there is no sign of new business being arranged. A few remnants of wire rods have been sold in warehouse at purely fancy figures.

The main feature in finished steel has been the

official advance of 10s. in the price of marked bars to £16 per ton net f.o.t., this advance being equal to about 18s. per ton as the old basis included 2½ per cent discount. This change was overdue and, although the official announcement was silent in regard to unmarked bars, it is taken for granted that the price of these will likewise be revised, negotiations being already under way. It is significant that the marked bar trade has been brought into line with other branches in the matter of net prices f.o.t. There is an unabated big demand for bar iron of all grades and also most kinds of finished steel, the works turning down orders daily because they are much in arrears on deliveries. The recent steel dispute in Sheffield was settled after causing a considerable setback in the output, and the question of Midland ironworkers' wages is now entirely settled on the claim put forward for a 12½ per cent increase as granted to the engineers.

Considerable business has been put through recently in tin plates, chiefly for France, the total orders released for this destination amounting to over 200,000 boxes for delivery this quarter on the full maximum basis. The larger makers are now very well booked for the next few months and insist on full terms. There is, however, some competition by works still in need of orders at prices about 1s. or so a box below the maximum basis, and the market is very quiet. Operations at mills are making satisfactory headway, current output being about 40 to 45 per cent of normal. Deliveries of bars are pretty regular.

There are a lot of orders in black sheets, the works being booked up for some months, chiefly for home war requirements. The bulk of the exports of this material is going to France. The basis quotation of C. A. 24 gage sheets stands officially at £17 10s. net f.o.t. at works, export being booked on the same basis.

There is a little more firmness in ferromanganese, although prices have remained unchanged, \$250 being asked for shipment c.i.f. to North American Atlantic ports. F.o.b. terms for Continental ports stand at £60 for loose and £63 for packed, a fair number of orders having been arranged lately against permits. The price for domestic users has been raised officially £1 10s. per ton to £26 10s. per ton, and more business is now going through.

St. Louis

ST. LOUIS, Feb. 25.

Pig Iron—A renewed effort to buy pig iron has been noted in the market during the past week and a considerable number of small purchases have been made for last half delivery. The inquiry from the smaller consumers is still large in the aggregate, but the larger users of pig iron, and especially basic, seem to regard themselves as sufficiently covered for the present at least. In the purchases which have been made during the past week, the stove molding interests of St. Louis, Belleville, Ill., and Quincy, Ill., have been the most notable, though there has been a general character to the buying. The sales made were chiefly of No. 2 and No. 3 Southern, with a little Northern iron for special uses. The aggregate was probably 5000 to 6000 tons and more could have been sold had the furnaces been in position to make contracts.

Coke—The pressure for coke continues severe, largely on delivery of coke already contracted for, with deliveries very unsatisfactory, both as to oven conditions and as to the cars available for transportation. No contracts of moment were entered into because of the situation, though it is recognized that some users are in such serious need that they would pay up to \$15 per ton to get coke, if that were permitted or possible.

Finished Iron and Steel—Finished products show no change in the matter of contracts or deliveries under contracts. Warehouses are unable to supply the demands upon them and are being pressed to the limit for material. We quote for stock out of warehouse as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets,

5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Old Material—The scrap market has been more active and stronger during the past week owing to some slight improvement in buying conditions and in the state of mind of the larger consumers, who, although they have not yet actively entered the market, are known to be getting rather low in their supplies in the yards. The strength shown so far has been more particularly in heavy shoveling steel, cast iron, malleable and railroad wrought. Dealers are inclined to do a little speculating, but are still rather cautious about it. Lists out include 1000 tons from the Cotton Belt, 2000 tons from the Big Four, 2000 tons from the Rock Island and a number of minor lists. We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails.....	\$36.00 to \$36.50
Old steel rails, rerolling.....	34.50 to 35.00
Old steel rails, less than 3 ft.....	37.50 to 38.50
Relaying rails, standard sections, subject to inspection.....	60.00 to 75.00
Old carwheels.....	29.50 to 30.00
No. 1 railroad heavy melting steel scrap.....	29.50 to 30.00
Heavy shoveling steel.....	29.50 to 30.00
Ordinary shoveling steel.....	27.00 to 27.50
Frogs, switches and guards cut apart.....	29.50 to 30.00
Ordinary bundled sheet scrap.....	24.00 to 24.50
Heavy axle and tire turnings.....	22.50 to 23.00

Pet Net Ton

Iron angle bars.....	\$35.50 to \$36.00
Steel angle bars.....	28.50 to 29.00
Iron car axles.....	45.50 to 46.00
Steel car axles.....	43.00 to 43.50
Wrought arch bars and transoms.....	41.50 to 42.00
No. 1 railroad wrought.....	30.75 to 31.25
No. 2 railroad wrought.....	30.00 to 30.50
Railroad springs.....	30.00 to 30.50
Steel couplers and knuckles.....	30.75 to 31.25
Locomotive tires, 42 in. and over, smooth inside.....	34.00 to 35.00
No. 1 dealers' forge.....	23.50 to 24.00
Cast iron borings.....	17.00 to 17.50
No. 1 busheling.....	25.50 to 26.00
No. 1 boilers, cut to sheets and rings.....	23.00 to 23.50
No. 1 railroad cast scrap.....	25.50 to 26.00
Stove plate and light cast scrap.....	20.50 to 21.00
Railroad malleable.....	26.00 to 26.50
Agricultural malleable.....	23.00 to 23.50
Pipes and flues.....	23.50 to 24.00
Heavy railroad sheet and tank scrap.....	22.50 to 23.00
Railroad grate bars.....	19.00 to 19.50
Machine shop turnings.....	17.50 to 17.75
Country mixed scrap.....	20.50 to 21.00
Uncut railroad mixed scrap.....	23.50 to 24.00

Buffalo

BUFFALO, Feb. 25.

Pig Iron—The railroad situation in so far as quicker movement of freight in transit and lifting of embargoes is concerned, is clearing up gradually, but the scarcity of cars and consequent delays in placing of empties for loading at furnaces is making it very difficult to ship out product promptly, so that in many instances furnaces are obliged to pile on yards a large part of current production. On this account, and because of the continued shortage of fuel supplies, most of the furnaces of the district are obliged to slow down, and some are able to operate only 50 to 70 per cent of normal capacity, while a number of stacks are out of blast. Almost the entire output of furnaces is going into Government work on either direct or indirect orders, leaving very little iron available for general foundry purposes, not before July 1, at any rate, although foundries are beseeching furnacemen for iron and calling for coke supplies. One interest advises it has had inquiry during the week for an aggregate of 22,000 tons of foundry and malleable for last half delivery, and that it was unable to quote. Recent price schedules are continued, f.o.b. furnace, Buffalo, as follows:

No. 1 foundry.....	\$34.50
No. 2 X.....	33.50
No. 3 foundry.....	32.50
Gray forge.....	32.00
Malleable.....	33.50
Basic.....	33.00
Lake Superior charcoal, f.o.b. Buffalo.....	39.75

Finished Iron and Steel—Increased inquiries are noted for both bar and structural material during the

past week, as well as a renewed pressure for delivery for nearly all classes of materials now on order books, indicating that stocks of finished materials are being depleted as a result of railroad conditions during the past 30 or 60 days. Mill operations are now assuming more nearly normal proportions as a consequence of the rapid improvement in the freight situation now taking place. A local bar mill reports it has taken on considerable new tonnage during the week, and an additional tonnage of plates for Government requirements has been ordered from a mill which is rolling plates for the Emergency Fleet Corporation.

Inquiries which were before the market a short time ago for shipbuilding material for Canadian shipbuilders have been withdrawn, as arrangements have been completed by which the Canadian Government, in co-operation with the United States officials at Washington, will be able to supply requirements of all the Canadian shipbuilding yards, estimated at 300,000 tons. It is understood the tonnage is to be distributed by the United States Government officials at Washington.

Old Material.—The news of the action by the Government in the establishment of fixed prices on some of the scrap commodities not heretofore included in the Government schedule of fixed prices was received with pronounced satisfaction by dealers here, as it will tend to stabilize prices in all grades traded in, and define the various grades more clearly. We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$30.00
Low phosphorus	40.00
No. 1 railroad wrought.....	35.00
No. 1 railroad and machinery cast.....	30.00
Iron axles	\$45.00 to 47.00
Steel axles	45.00 to 47.50
Carwheels	30.00
Railroad malleable	35.00
Machine shop turnings	18.00 to 18.50
Heavy axle turnings	25.00
Clean cast borings	19.00 to 20.00
Iron rails	37.00 to 38.00
Locomotive grate bars.....	25.00
Stove plate	25.00
Wrought pipe	29.00
No. 1 busheling scrap.....	30.00
No. 2 busheling scrap.....	22.00 to 24.00
Bundled sheet stamping scrap.....	22.00 to 24.00

New York

NEW YORK, Feb. 27.

Pig Iron.—Some melters are becoming insistent in regard to placing orders, and in a few cases are asking furnaces to quote for the first quarter of 1919 if they are unwilling to quote for the last half of this year. Furnaces continue, however, to adhere to a conservative policy, one reason given being that there is not yet certainty as to fuel and car conditions, and they do not know how much pig iron they can produce. Sales are made only under unusual conditions as, for example, in the cases of two lots of 1200 and 800 tons each of Virginia foundry iron. Small quantities of Alabama iron are being purchased by some melters for fear they will not be able to obtain Northern grades. One furnace which offered 500 tons of low phosphorous for sale during the past few days, disposed of it immediately. For early delivery, we quote as follows:

No. 1 X.....	\$35.25
No. 2 X.....	34.25
No. 2 Plain	33.75
No. 2 Southern (rail and water).....	\$38.75 to 39.25
No. 2 Southern (all rail).....	39.15 to 39.65
No. 2 X Virginia.....	37.00 to 37.25

Ferroalloys.—The domestic ferromanganese market is strong and firm at \$250, delivered. Sales of carload and small lots are reported at this level for prompt and first half delivery. Inquiry is fairly brisk for small consignments for early delivery. One Western consumer is asking for prices on nearly 1000 tons for delivery in the last half, which is one of the first inquiries for this delivery. There are no further developments in the Brazilian manganese ore situation, the embargo on shipments from there still being effective. Spiegeleisen is strong at \$60 to \$65, furnace, but there is very little available for delivery in the first half, most producers being well sold up. One maker is reported as asking as high as \$75, but with little to sell. Ferrosilicon, 50 per cent, is strong and active, with

sales made at \$175 to \$190 per ton, depending on the quantity and delivery. Some other ferroalloys are quoted in this paragraph in the first issue of each month.

Cast-Iron Pipe.—Considerable private business is being figured on, but no important public lettings have developed. The 1000 tons recently inquired for by the city of Buffalo has been formally placed with the United States Cast Iron & Foundry Co., it being a low bidder as heretofore announced. The Government prices continue as follows: \$55.35, New York, for 6-in. and heavier, and \$58.35 for 4-in.; \$65.35 for 3-in. and \$1 additional for class A and gas pipe.

Old Material.—The feeling among scrap dealers is distinctly more optimistic, due, in part, to improved supply of cars and milder weather and in part to the announcement of new prices and regulations governing important grades of scrap, but the effect of the announcement by Judge Gary has not yet been fully determined. The outlook is that there will soon be an ample supply of scrap and prices may sag. The supply of machine shop turnings now coming out is tremendous owing to the large amount of work being done on shell steel. Railroads are showing an increasing tendency to sell direct to large buyers and brokers are being eliminated to a considerable extent. We have revised quotations in accordance with the new Government regulations and quote prices of brokers as follows to New York producers and dealers per gross ton New York, although some prices are still nominal, as it is not certain that Government prices will be maintained.

Heavy melting steel.....	\$27.80
Rerolling rails	32.60
Relaying rails	\$60.00 to 70.00
Iron and steel car axles.....	45.30
No. 1 railroad wrought.....	32.80
No. 1 railroad wrought cut to not less than 10 in. or over 24 in.....	37.80
Wrought-iron track scrap.....	32.80
No. 1 yard wrought long.....	31.80
Light iron	9.00 to 10.00
Cast borings (clean).....	17.80
Machine-shop turnings	17.80
Mixed borings and turnings.....	14.50 to 15.50
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long.....	31.80

Prices which dealers in New York and Brooklyn are permitted to quote to local foundries, per gross ton, are:

No. 1 machinery cast.....	\$32.80
No. 1 heavy cast (columns, building materials, etc.)	27.80
No. 2 cast (radiators, cast boilers, etc.).....	27.80
Stove plate	27.80
Locomotive grate bars.....	27.80
Malleable cast (railroad).....	32.80
Old carwheels	27.80

Finished Iron and Steel.—There is a widening belief that the Emergency Fleet Corporation will not require so many ship plates as was earlier claimed, and this fact, together with new capacity coming in from time to time, is lending hope that active exporting of ship plates may be resumed before long. A round tonnage for export, thought to be about 5000 tons, has been offered to one mill for delivery in say 60 days, at 3.75c. maker's mill. While attractive from the mill standpoint, the price is lower than has been regarded as the export price, and as yet the business has not been accepted. No activity is noted in the domestic market, though there are numerous inquiries for export. The fact is commented on that whereas it is possible to get a three months' permit for export, provided the freight traffic committee will allow for securing the cars, the freight license is issued for only 30 days, a period practically always too short for the scheduling by any mill of any sizable order. Bar iron mills could take on more business; some have made quotations of 3.50c., mill, as against a more general quoting of 3.50c., Pittsburgh basis. The decided drop in volume of fabricated business is indicated in the report elsewhere of the records of the Bridge Builders' and Structural Society showing that the January contracting was 53 per cent of capacity against 114 per cent for December. Recent fabricated awards include 400 tons for work in Tennessee placed by the Thompson-Starrett Co., and 200 tons for an extension to the power house of the New York Shipbuilding Co., the latter awarded to Lewis

F. Shoemaker & Co. Settlement at this writing has probably been made on two bridges for the Pennsylvania, totaling 1300 tons, and 2200 tons at the League Island Navy Yard has been placed with McClaskey & Bahls. The Thompson-Starrett Co. has taken bids on 1100 tons for the Charleston, S. C., powder plant, and Barber & Ross will fabricate a bank addition at Winston-Salem. France has bought 1500 155-mm. gun forgings and 250 75-mm. forgings. Railroad equipment, including railroad cars and about 65,000 tons of steel rails, has been offered for sale, presumably parts of material bought and paid for on Russian account but never delivered. Government prices are, of course, ruling.

IRON AND INDUSTRIAL STOCKS

Changes in Values Are Small—Improvement in Plant Operations Not Yet Reflected

NEW YORK, Feb. 25.

Prices moved somewhat irregularly last week, responding variously to more or less disconnected influences. The improvement in steel mill and shop operations has not yet affected stock market values. For the most part adverse developments in Russia were discounted, although it is evident that the general belief that Germany will gain greatly in supplies of materials has checked any undue optimism over the war situation. The absence of definite legislation by Congress has also tended to hold off any rise in stock values. All in all, however, prices are a bit higher, but not appreciably so in steel and metal-working industrials. United States Steel com. fell off $\frac{3}{4}$ point, pref. $\frac{1}{2}$ point, being the only big steel producing company to lose ground.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	24 $\frac{1}{4}$ -27 $\frac{3}{4}$	Int. Har. Corp.	
Allis-Chalm. pf.	80-81 $\frac{1}{2}$	com.	70
Am. Can. com.	40-42 $\frac{1}{2}$	Lack. Steel.	77-80 $\frac{1}{2}$
Am. Can. pf.	94 $\frac{1}{2}$ -95	Lake Super. Corp.	15 $\frac{1}{2}$ -16 $\frac{1}{2}$
Am. Car & Fdry.		Midvale Steel	45-46 $\frac{1}{2}$
com.	72 $\frac{1}{2}$ -76 $\frac{1}{4}$	Nat.-Acme	30-31
Am. Car & Fdry.		Nat. En. & Stm.	
pf.	110 $\frac{1}{2}$	com.	47-53 $\frac{3}{4}$
Am. Loco. com.	64-68 $\frac{1}{2}$	Nat. En. & Stm.	
Am. Ship com.	90-90 $\frac{1}{2}$	pf.	99 $\frac{1}{2}$
Am. Steel Fdries.	65-66 $\frac{1}{2}$	N. Y. Air Brake	133 $\frac{3}{4}$ -137 $\frac{3}{4}$
Bald. Loco. com.	72-81 $\frac{3}{4}$	Nova Scotia Steel	67 $\frac{1}{2}$
Beth. Steel com.	80 $\frac{3}{4}$ -82	Pitts. Steel pf.	93 $\frac{1}{2}$
Beth. Stl. Cl. B.	78 $\frac{3}{4}$ -82 $\frac{1}{2}$	Press. Steel com.	59 $\frac{1}{2}$ -68 $\frac{1}{2}$
Case (J. I.) pf.	84	Press. Steel pf.	98
Cent. Fdry. pf.	43 $\frac{1}{2}$ -43 $\frac{3}{4}$	Ry. Stl. Spr. com.	52 $\frac{1}{2}$ -55 $\frac{1}{2}$
Chare'l Iron com.	81 $\frac{1}{2}$ -81 $\frac{1}{2}$	Republic com.	77 $\frac{3}{4}$ -81 $\frac{1}{2}$
Chic. Pn. Tool.	52-53 $\frac{1}{2}$	Republic pf.	98 $\frac{1}{2}$ -99 $\frac{1}{2}$
Colo. Fuel	39-41 $\frac{1}{4}$	Sloss com.	50-52 $\frac{1}{2}$
Cruc. Steel com.	62-68 $\frac{3}{4}$	Superior Steel	36 $\frac{1}{4}$ -37 $\frac{1}{2}$
Cruc. Steel pf.	89 $\frac{3}{4}$ -90	Transue-Wms.	40-40 $\frac{1}{4}$
Gen. Electric	138 $\frac{3}{4}$ -142 $\frac{1}{2}$	Un. Alloy Steel	38 $\frac{3}{4}$ -40
Gt. No. Ore Cert.	28 $\frac{1}{2}$ -29 $\frac{3}{4}$	U. S. Pipe com.	15
Gulf States Steel	92 $\frac{1}{2}$ -95	U. S. Pipe pf.	43-45
Int. Har. of N.		U. S. Steel com.	94 $\frac{3}{4}$ -98 $\frac{1}{4}$
J. com.	128 $\frac{1}{4}$ -130	U. S. Steel pf.	110-111 $\frac{1}{4}$
Int. Har. of N.		Va. I. C. & Coke	64-65
J. pf.	102 $\frac{1}{2}$	Westingh. Elec.	41-42 $\frac{3}{4}$

Dividends

The Cambria Steel Co., quarterly, 75c. and extra 75c., payable March 15.
The Crucible Steel Co. of America, quarterly, 1 $\frac{1}{4}$ per cent on the preferred, payable March 30.
The General Electric Co., quarterly, 2 per cent, payable April 15.
The Gulf States Steel Co., quarterly, 2 $\frac{1}{2}$ per cent on the common, 1 $\frac{1}{4}$ per cent on the first preferred and 1 $\frac{1}{2}$ per cent on the second preferred, all payable April 1.
The National Enameling & Stamping Co., quarterly, 1 $\frac{1}{2}$ per cent on the common, payable March 20, and 1 $\frac{1}{4}$ per cent on the preferred, payable March 30.
The New York Air Brake Co., quarterly, 5 per cent, payable March 22.
The Republic Iron & Steel Co., quarterly, 1 $\frac{1}{2}$ per cent on the common, payable May 1, and 1 $\frac{1}{4}$ per cent on the preferred, payable April 1.

New Subsidiaries

BIRMINGHAM, ALA., Feb. 26.—Incorporation papers were filed the past week in the probate office in Birmingham by the four subsidiary organizations of the Tennessee Coal, Iron & Railroad Co., which is in itself a subsidiary of the United States Steel Corporation, for

the development at Fairfield, adjacent to Ensley, Ala., and shipbuilding plant and accessories at Mobile, Ala. Each company is capitalized at \$50,000, and George Gordon Crawford, president of the Tennessee Coal, Iron & Railroad Co., is president, H. C. Ryding vice-president and L. T. Beecher, secretary-treasurer. The new companies are the Fairfield Steel Co., the Chickasaw Shipbuilding Co., the Chickasaw Land Co. and the Chickasaw Utilities Co. The last-named company will provide electric power, heat and light for the shipbuilding plant and also construct a street car to connect with the Mobile street railway system.

The developments at Fairfield and Mobile are being rushed. At Fairfield, where additional steel plants will be erected for the production of steel plates and shapes for shipbuilding, the actual erection of buildings will be started on this week, the American Bridge Co. having the bulk of these contracts. Machinery has been ordered, and within the next 60 to 90 days will begin arriving here.

New Canadian Jobbing House

The Manitoba Steel & Iron Co., Ltd., Winnipeg, Canada, was recently organized and the following board of directors elected for the ensuing year: T. R. Deacon, H. B. Lyall, Sir Augustus Nanton, George F. Galt, G. W. Allan, K.C.M.P., Sir Douglas Cameron, Charles Pope, Captain William Robinson, W. H. Cross. The directors elected these officers: T. R. Deacon, president; H. B. Lyall, vice-president; Walter Stuart, secretary.

The company has been incorporated with a Dominion charter, with an authorized capital of \$500,000, to take over the merchant end of the business of the Manitoba Bridge & Iron Works, which has grown to considerable dimensions.

The new company is strongly financed and will carry on a general merchant business in structural steel, plates and sheets, bar iron and steel, boiler-tubes, rivets, bolts, railway supplies, mining equipment, heavy forging billets and stock for shipbuilding. An entire block of land with suitable warehouse has been purchased. Business will be commenced March 1. Authority is also given under the charter to build and operate rolling mills and blast furnaces.

The Manitoba Bridge & Iron Works purposes confining its business largely to the manufacturing side of the business, for which this change will afford more room on the present site. The latter company is also applying for a Dominion charter with an authorized capital of \$1,000,000.

Pressed Steel Car Co. Report

The annual report of the Pressed Steel Car Co. for year ended Dec. 31, 1917, shows net profits of \$2,130,308, a decrease of \$620,844 as compared with 1916. Deducting \$875,000 preferred dividends from net profits there remained a balance of \$1,255,308 available for the \$12,500,000 common stock, equal to \$10 a share, as against a balance equal to \$15.01 a share in 1916. Last year's income account compares as follows:

	1917	1916	1915	1914
Gross sales	\$44,034,844	\$31,202,646	\$17,492,621	\$13,575,090
Profits	2,430,308	3,051,152	1,324,815	892,351
Depreciation	300,000	300,000		
Balance	\$2,130,308	\$2,751,152	\$1,324,815	\$893,351
Pfd. divs.	875,000	875,000	875,000	875,000
Com. divs.	875,000	531,250		
Surplus	\$380,308	\$1,344,902	\$449,815	\$17,351
Prev. sur.	10,217,069	8,872,167	8,422,352	8,405,001
P. & L. sur.	\$10,597,377	\$10,217,069	\$8,872,167	\$8,422,352

Baldwin Locomotive Earnings

Record figures in all departments were established by the Baldwin Locomotive Works last year, according to the annual report just issued. Gross sales were \$98,263,865, compared with \$59,249,057 in 1916, an increase of nearly 60 per cent. Last year's sales came to \$63,455,574 from construction of 2748 new locomotives, \$13,835,707 from other regular work, and \$20,972,583 from shells and other special work.

From last year's business the company earned a

manufacturing profit of \$11,779,019, against \$6,361,710 the previous year, and after payment of fixed charges and preferred dividends and deduction of \$1,750,000 for Federal taxes, a surplus of \$6,905,722, against \$1,219,465 the preceding twelve months. Such surplus income last year was equal to nearly \$35 a share on \$20,000,000 common stock, compared with a little more than \$6 a share the previous year.

Very large earnings had been forecast, but a surprising feature is the announcement that \$15,800,000 has been charged off from accumulated surplus for extinguishment of patents and good will, bringing the final surplus at the end of the year down to only \$55,346.

Industrial Finances

Last week the National Tube Co., Frick Building, Pittsburgh, filed a notice at Trenton, N. J., of an increase in its capital stock from \$80,000,000 to \$85,000,000. This increase is to cover the payment by that company for the plant of the Shelby Steel Tube Co., Ellwood City, Pa., maker of seamless tubes. The stock of the latter company was held by the United States Steel Corporation, and the issue by the National Tube Co. was made in lieu of an issue by the Shelby company. By the terms of the increase the stock of the National Tube Co. is divided into 400,000 shares of preferred and 450,000 shares of common stock.

For the information of its stockholders in making out income tax returns, the Youngstown Sheet & Tube Co. has sent a letter to each of its stockholders as follows:

Dividend paid on Jan. 1, 1917, was paid out of the earnings of 1916. Dividend paid on April 1, 1917, was paid from earnings of 1916. Dividend paid on July 1, 1917, was paid out of 1917 earnings. Dividend paid on Oct. 1, 1917, was paid out of 1917 earnings. This applies to both common and preferred stocks.

Net operating income of the Gulf States Steel Co. for 1917, according to preliminary figures, amounted to \$4,199,925, an increase of \$1,549,919 over the previous year. After deductions for depreciation and reserves for all taxes, the net income was \$2,882,176, compared with \$2,452,510 in 1916.

Youngstown Sheet & Tube Co. Scrap Specifications

Youngstown Sheet & Tube Co., Youngstown, Ohio, has a varied line of products necessitating the use of a widely diversified line of old material. The company has lately issued scrap specifications covering its requirements as follows:

BRIDGE SCRAP: Must be entirely cut apart and free from rivets and bolts. No material other than plates, eye bars, I-beams, angles and channels accepted. Plates must be at least 3/16 in. thick. Minimum width of channels and I-beams 6 in.; minimum length 3 ft. Angles must be at least 4 in. on one flange and not less than 3 ft. long. Eye bars must be flat and straight. All material must be sheared clean and no material that is curved or twisted, or has bent or mashed flanges, will be accepted. All bridge scrap must be strictly wrought iron.

TANK PLATES: Must be entirely cut apart, flat, free from rivets, at least 3/16 in. thick, and strictly wrought iron.

PILING PLATES: Must be No. 8 gage to 1/2 in. thick, flat, free from rivets, 5 in. to 20 in. wide, 18 in. to 24 in. long and strictly wrought iron.

ARCH BARS AND TRANSOMS: Must be cut apart, free from rivets, bolts, castings or other foreign material. Coupler yokes and engine frames cannot be accepted with arch bars and transoms; material must be strictly wrought iron.

MISCELLANEOUS FLATS: May run from 3 in. to 8 in. in width, 1/2 in. to 1 in. in thickness and 12 in. and longer. Must be flat and clean and strictly wrought iron.

BUSHELING SCRAP: Must all be strictly wrought iron, not to exceed 8 in. in length or width. Rivets, bolts, nuts, scrap chain, bar croppings, plate punchings and clippings, cut pipe, etc. Where tank or plate scrap or punchings are included, no material lighter than 10 gage will be accepted.

No. 1 BORINGS: Must be of large size, car wheel borings or equivalent, and strictly cast iron.

No. 2 BORINGS: Must be clean and free from other metals, dirt and lumps, and strictly cast iron.

MIXED BORINGS AND TURNINGS: Clean and free from other metals, dirt and lumps.

No. 1 HEAVY MELTING STEEL: Railroad steel and heavy steel croppings from rails, billets, blooms, structural shapes, plates, bars, rods, channels, angles, plate shearings from steel plates—not needle or skeleton scrap—steel rolls and other similar material. All charging box size, not over 7 ft. in length or 18 in. wide and not lighter than 1/4 in. thick. Minimum weight 10 lb., maximum 300 lb. No agricultural shapes, boiler tubes, grate bars, cast iron, sheet stock or light stock of any description, or curly or unwieldy pieces will be accepted. All must be clean and free from all dirt and rubbish and excessive rust. Must be loaded in cars which contain no other grade of scrap.

SHOVELING STEEL: Heavy clean stock, such as railroad track scrap, including spikes, bolts, nuts, etc., boiler and bridge punchings and clippings, small crop ends, bolt ends and other similar material. All must be 1/4 in. or over in thickness and not to exceed 12 in. in length and 12 in. in breadth. No light or tangled material or skeleton scrap will be accepted. Must be loaded in cars which contain no other grade of scrap.

BUNDLED SHEET SCRAP: SIDES AND ENDS: Strictly new clean side and end clippings and shearings securely bound with at least two wires placed at sufficient distance from each other to permit handling with a magnet without damage. Not to exceed 125 lb. per bundle in weight and to be of charging box size. Must not contain stamping or galvanized scrap in any quantity. **BUNDLED STAMPING SCRAP:** Strictly new, clean sheet scrap from stamping presses, unmixed with any kind of coated material, and bundled as above. **HYDRAULIC COMPRESSED SCRAP:** Steel sheet clippings and shearings, stamping scrap, tin mill scrap, or its equivalent. Must be clean and free from excessive rust, paint or protective coating of any kind, and securely compressed in rectangular bundles weighing not less than 65 lb. per cubic foot. **BALED SCRAP:** Steel sheet clippings and shearings, stamping scrap, tin mill scrap or its equivalent, must be clean and free from excessive rust, paint or protective coating of any kind, and securely baled in rectangular bundles weighing not less than 45 lb. per cubic foot. **HAND BUNDLED SCRAP:** Steel sheet clippings and shearings, stamping scrap, tin mill scrap or its equivalent, clean and free from excessive rust, paint or protective coatings of any kind, and securely bundled with wire so as to permit handling with a magnet. **GALVANIZED SCRAP:** Any clean, steel sheet scrap composed in whole or in part of material having a coating of zinc, paint or other protective material. Must be clearly specified as Galvanized Scrap and be classified as above, according to the manner in which it is bundled.

TURNINGS: MACHINE SHOP TURNINGS: Strictly new and clean steel turnings, free from rust and foreign matter. Must permit handling with magnet.

Pig Iron Manufacture in South Africa

The Transvaal Blast Furnace Co., Ltd., the pioneer in the manufacture of pig iron in South Africa, is now installing a blast furnace close to the rapidly growing town of Vereeniging, according to a statement by Isaac Lewis at a recent meeting of the Vereeniging Estates. The Pretoria blast furnace industry, recently reported on by Professor Stanley and Doctor Wagner, is gradually realizing the following final passage in a recent report: "Having regard to present conditions, the smelting of these ores on the small scale should be technically and commercially successful, and the erection of a small blast furnace burning charcoal and capable of producing about 100 tons of iron per week, is recommended as being the best and quickest way of turning the ores to account. The capital cost should not exceed £12,000, and the working cost would be about £6 to £10 per ton, while the selling price would be two or three times this figure. There are good prospects that this small beginning will eventually expand into a large iron and steel industry."

The "shipping day" or "sailing date" plan for accepting and forwarding less-than-carload freight on the Pennsylvania Railroad has now been extended to cover the service on all of the 25 divisions east of Pittsburgh and Erie. Schedules providing "shipping days" for each division have been worked out and the new method placed in actual operation on all portions of the Eastern lines.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 40c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, 75c.; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is 90c., minimum carload, 40,000 lb.; and 85c., minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 40c., minimum carload 46,000 lb.; to St. Paul, 35.5c., minimum carload 46,000 lb.; Denver, 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zebs, structural sizes, 3c.

Wire Products

Wire nails, \$3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire, \$3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.25; galvanized wire, \$3.95; galvanized barb wire and fence staples, \$4.35; painted barb wire, \$3.65; polished fence staples, \$3.65; cement-coated nails, \$3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets \$4.65 base
7/16 in. x 6 in. smaller and shorter rivets, 45-10 per cent off list
Machine bolts h.p. nuts, 5/8 in. x 4 in.:
Smaller and shorter, rolled threads, 50-10-5 per cent off list
Cut threads 50-5 per cent off list
Larger and longer sizes, 40-10 per cent off list
Machine bolts c.p.c. and t. nuts, 5/8 in. x 4 in.:
Smaller and shorter, 40-10 per cent off list
Larger and longer, 35-5 per cent off list
Carriage bolts, 5/8 in. x 5 in.:
Smaller and shorter, rolled threads, 50-5 per cent off list
Cut threads 40-10 per cent off list
Larger and longer sizes, 40 per cent off list
Lag bolts 50-10 per cent off list
Flow bolts, Nos. 1, 2, 3 50 per cent off list
Hot pressed nuts, sq. blank 2.50c. per lb. off list
Hot pressed nuts, hex., blank 2.30c. per lb. off list
Hot pressed nuts, sq., tapped 2.30c. per lb. off list
Hot pressed nuts, hex., tapped 2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank 2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped 2.00c. per lb. off list
Semi-finished hex nuts:
5/8 in. and larger 60-10-10 per cent off list
9/16 in. and smaller 70-5 per cent off list
Stove bolts 70-10 per cent off list
Stove bolts 2 1/2 per cent extra for bulk
Tire bolts 50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$57; chain rods, \$65; screw, rivet and bolt rods and other rods of that character, \$65. Prices on high carbon rods are irregular. They range from \$70 to \$80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4 1/2 in. and heavier, per 100 lb., \$3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, \$4.90. Boat spikes, \$5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective Nov. 7 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., \$15 per package; 8-lb. coating, 1 C., \$15.30; 12-lb. coating, 1 C., \$16.75; 15-lb. coating, 1 C., \$17.75; 20-lb. coating, 1 C., \$19; 25-lb. coating, 1 C., \$20; 30-lb. coating, 1 C., \$21; 35-lb. coating, 1 C., \$22; 40-lb. coating, 1 C., \$23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/8, 1/4 and 3/8	44	17 1/2	1/4 and 1/2	23	+4
1/2	48	33 1/2	3/8	24	+3
3/4 to 3	51	37 1/2	1/2	28	10
			3/4 to 1 1/2	33	17
Lap Weld			Lap Weld		
2	44	31 1/2	1 1/4	18	3
2 1/2 to 6	47	34 1/2	1 1/2	25	11
7 to 12	44	30 1/2	2	26	12
13 and 14	34 1/2	..	2 1/2 to 6	28	15
15	32	..	7 to 12	25	12
Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
1/8, 1/4 and 3/8	40	22 1/2	1/4, 1/4 and 3/8	22	5
1/2	45	32 1/2	1/2	27	14
3/4 to 1 1/2	49	36 1/2	3/4 to 1 1/2	33	18
2 to 3	50	37 1/2			
Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
2	42	30 1/2	1 1/4	19	4
2 1/2 to 4	45	33 1/2	1 1/2	25	11
4 1/2 to 6	44	32 1/2	2	27	14
7 to 8	40	26 1/2	2 1/2 to 4	29	17
9 to 12	35	21 1/2	4 1/2 to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5 1/2 points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		Charcoal Iron	
3 1/2 to 4 1/2 in.	34	3 1/2 to 4 1/2 in.	12 1/2
2 1/2 to 3 1/4 in.	34	3 to 3 1/4 in.	+ 5
2 1/4 in.	17 1/2	2 1/2 to 2 3/4 in.	+ 7 1/2
1 3/4 to 2 in.	13	2 to 2 1/4 in.	+ 22 1/2
		1 3/4 to 1 1/2 in.	+ 35
Standard Commercial Seamless—Cold Drawn or Hot Rolled		Standard Commercial Seamless—Cold Drawn or Hot Rolled	
Per Net Ton		Per Net Ton	
1 in.	\$340	1 1/4 in.	\$220
1 1/4 in.	280	2 to 2 1/2 in.	190
1 3/8 in.	270	2 1/2 to 3 1/4 in.	180
1 1/2 in.	220	4 in.	200
		4 1/2 to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days:

Blue Annealed—Bessemer		Blue Annealed—Bessemer	
Cents per lb.		Cents per lb.	
Nos. 8 and heavier	4.20	Nos. 17 to 21	4.80
Nos. 9 and 10	4.25	Nos. 22 and 24	4.85
Nos. 11 and 12	4.30	Nos. 25 and 26	4.90
Nos. 13 and 14	4.35	No. 27	4.95
Nos. 15 and 16	4.45	No. 28	5.00
		No. 29	5.10
		No. 30	5.20
Box Annealed, One Pass Cold Rolled—Bessemer		Galvanized Black Sheet Gage—Bessemer	
Cents per lb.		Cents per lb.	
Nos. 10 and 11	5.25	Nos. 10 and 11	5.25
Nos. 12 and 14	5.35	Nos. 12 and 14	5.35
Nos. 15 and 16	5.50	Nos. 15 and 16	5.50
Nos. 17 to 21	5.65	Nos. 17 to 21	5.65
Nos. 22 and 24	5.80	Nos. 22 and 24	5.80
Nos. 25 and 26	5.95	Nos. 25 and 26	5.95
No. 27	6.10	No. 27	6.10
No. 28	6.25	No. 28	6.25
No. 29	6.50	No. 29	6.50
No. 30	6.75	No. 30	6.75
Tin-Mill Black Plate—Bessemer		Tin-Mill Black Plate—Bessemer	
Cents per lb.		Cents per lb.	
Nos. 15 and 16	4.80	Nos. 15 and 16	4.80
Nos. 17 to 21	4.85	Nos. 17 to 21	4.85
Nos. 22 to 24	4.90	Nos. 22 to 24	4.90
Nos. 25 and 27	4.95	Nos. 25 and 27	4.95
No. 28	5.00	No. 28	5.00
No. 29	5.05	No. 29	5.05
No. 30	5.10	No. 30	5.10
Nos. 30 1/2 and 31	5.10	Nos. 30 1/2 and 31	5.10

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery							
Feb.	Copper, Lake	New York Electro-lytic	Tin, New York	Lead		Spelter	
				New York	St. Louis	New York	St. Louis
20.....	23.50	23.50	*85.00	7.00	6.85	8.00	7.75
21.....	23.50	23.50	*85.00	7.00	6.85	8.00	7.75
23.....	23.50	23.50	*85.00	7.00	6.85	8.00	7.75
25.....	23.50	23.50	*85.00	7.00	6.85	8.00	7.75
26.....	23.50	23.50	*85.00	7.25	7.10	8.00	7.75

*Nominal.

NEW YORK, Feb. 27.

There were no markets on Friday, Feb. 22. Demand is light in all metals. Copper is entirely featureless under the controlled conditions. Tin has been quiet with spot Straits nominal and unobtainable. Lead is strong and higher. Spelter continues inactive but with a tendency to weakness. Antimony is unchanged.

New York

Copper.—The market presents no new developments of importance. There is some talk in the trade as to the extent to which refinery earnings are being lessened because of the constant withdrawal of labor in this district from such plants to the more lucrative field of shipbuilding and other Government work. The statement is made that if a further advance is to be made in wages, the profit in the smelting of copper at the works in the East would practically disappear. These considerations are expected to be used in an argument for a higher price for copper when the revision is made as of June 1. Regular business is reported at the Government prices of 23.50c. and 24.67½c. per lb., depending on the quantity. January exports of 48,657 tons, reported last week in this market, compare with a monthly export rate of 40,311 tons in a year when the total was phenomenal.

Tin.—The market has been quiet in the past week and entirely featureless. A little business is reported in off grades but the total was not large. Transactions are confined entirely to future tin, there being no spot metal available, the quotation for spot Straits being nominal at 85c., New York. The situation as to Straits tin is simply to look on, wait and do nothing, as it is not available even for future delivery. In the last week the London market again advanced, spot Straits having been quoted yesterday at £319 10s. per ton, as compared with £316 a week ago. Arrivals to Feb. 26 inclusive have been 1040 tons, with the quantity afloat estimated at 4900 tons.

Lead.—Yesterday the American Smelting & Refining Co. again advanced its price ¼c. per lb. to 7.25c., New York. This is the second advance in three weeks. The outside market has met the advance and it is also quoted at 7.25c., New York, or 7.10c., St. Louis. The market is quiet but demand is picking up slowly. There has been a little more interest displayed in the last week. The strength of the market is said to be due largely to the continued interference of transportation difficulties with the normal course of trade. Some dealers, however, report a much better receipt of metal from railroads than in a long time. The opinion is expressed that prices are not likely to advance any further.

Spelter.—The market continues lifeless and uninteresting. Prime Western for early delivery is quoted at 7.75c., St. Louis, or 8c., New York, but 7.70c., St. Louis can be and has been done on carload and small lots. The Government has asked for bids on about 500 tons of Grade C, which is nearly the same as prime Western in composition. Large quantities of Grade A and high grade spelter continue to be absorbed by the Government and its allies. Grade A is officially fixed at 12c. per lb. with sheet zinc pegged at 15c. per lb.

Antimony.—The market is quiet at 13.50c., New York, duty paid, for Chinese and Japanese grades for prompt delivery. Bids on 130,000 lb. for the Navy were

opened last week on which the low was 13.50c., New York.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, is a little stronger and quoted at 37c. to 38c., New York, for prompt and March delivery.

Old Metals.—The market is quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible (nominal).....	23.50
Copper, heavy and wire (nominal).....	23.50
Copper, light and bottoms.....	21.00 to 21.50
Brass, heavy.....	16.75 to 17.00
Brass, light.....	12.25 to 12.50
Heavy machine composition.....	24.00 to 24.25
No. 1 yellow rod brass turnings.....	13.00 to 14.00
No. 1 red brass or composition turnings.....	19.00 to 20.00
Lead, heavy.....	6.50
Lead, tea.....	5.25
Zinc.....	6.00

Chicago

FEB. 26.—The market is still devoid of spot tin and transactions are confined to futures. Lead is stronger but quiet. The demand for copper is large because of the failure of shipments to arrive from refineries. Spelter is quiet, makers asserting they are sold up with but little to offer. We quote: Copper, 23.50c. in carloads and 24.67½c. for part carloads; tin, 85c. to 90c. for metal due to arrive; spelter, 7.75c.; lead, 7.05c.; antimony, 15.50c. to 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 20c.; copper bottoms, 19c.; red brass, 20c.; yellow brass, 14.50c.; lead pipe, 5.50c.; zinc, 5.25c.; pewter, No. 1, 42.50c.; tinfoil, 50c., and block tin, 57.50c.

St. Louis

FEB. 25.—Non-ferrous metals have been quiet, but firm, with some items on the list rather scarce. The close to-day, on carload lots, was: Lead, 7c.; spelter, 7.75c. In less than carload lots, the quotations were: Lead, 7.50c.; spelter, 8.50c.; tin, 90c.; copper, 25.12c.; Asiatic antimony, 17.50c. Tin is very scarce and almost unobtainable in this market. The Government price on spelter has not yet been put in effect in this market and quotations, therefore, are made with this fact in view. In the Joplin district, the production is improving, the severe weather having passed, but the shipping difficulties continue and cars are hard to get, which is making the smelters cautious about their purchases. Zinc blends, basis of 60 per cent metal ranged from \$50 to \$70 per ton, with the average for the week at \$56 per ton. Calamine was \$32 to \$35 per ton, basis of 40 per cent metal, with the average for the district \$34 per ton. Lead ore, basis of 80 per cent metal, was strong at \$85 per ton and the average for the district was at the same figure. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper, and copper wire, 20c.; pewter, 25c.; tinfoil, 50c.; lead, 5c.; zinc, 5.50c.; tea lead, 5c.

Employees' Subscriptions to Steel Common

The Finance Committee of the United States Steel Corporation makes public the fact that 43,251 employees have subscribed since Jan. 1 to common stock, the number of shares taken being 95,437. The subscription price was \$92 a share. Last year 39,230 workers subscribed for 67,711 shares at \$107 a share. The gain in the number of subscribers is figured to be proportionate to the increase of names on the payroll in January, 1918, over January, 1917, but the 40 per cent expansion in the number of shares applied for reflects a greater interest than was ever before shown. The stock is paid for on the installment plan.

The annual meeting of the Cincinnati branch of the National Metal Trades Association will be held at the Cincinnati Business Men's Club March 7. A. H. Tuechter is president, J. M. Manley secretary. W. H. Vandervoort, Moline, Ill., will be the principal speaker.

Pittsburgh and Nearby Districts

The Machinists' Supply Co., 324 Third Avenue, Pittsburgh, carries a complete stock of the products of the Abrasive Co. of Philadelphia.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has recently secured the exclusive sales agency for the United States for solderless connectors, widely used for joining electrical wires and cables. Manufacturing facilities have been increased by the Frankel Connector Co., in order to care for the new business to be secured through the Westinghouse sales organization. The Westinghouse company will act also as a distributor of Frankel testing clips.

The Westinghouse Electric & Mfg. Co. has removed its Phenix, Ariz., office to Tucson, Ariz. J. H. Knost and W. G. Willson, representatives, will have headquarters in the Immigration Building, Tucson.

Last week all six blast furnaces of the Carnegie Steel Co. at its Ohio works, Youngstown, Ohio, were in operation, the first time for several months. The six stacks are expected to operate all this week, as the supply of coke is better than for a long time.

The Independent Truck Co. has bought a site in Youngstown, Ohio, on which it will build a plant. Its business is to be removed from Port Huron, Mich. The company has a capital of \$300,000, and its new plant will be capable of turning out about 20 trucks per month. It hopes to have it in operation about May 15.

School for Munitions Inspectors

The War Department is to establish a school for training men in artillery ammunition inspection in Boston. Men with technical education or practical experience are particularly wanted to enroll for training at once. The course will include lectures by army instructors during the first few weeks, followed by practical shop experience in the arsenals and munition factories throughout New England.

According to G. A. Sagendorph, civilian representative, civilian personnel division, Ordnance Department, 45 Bromfield Street, Boston, it is the intention to establish schools at Worcester, Springfield, Hartford and Providence. "Lack of inspectors," he says, "will seriously delay necessary shipments to France. We have found that it was not so much the lack of patriotism as the lack of trained men in this work. So great has been the demand and so small the number of experts available, that we have been authorized by the War Department to open this school of training."

Application for enrollment in the new school should be made with Mr. Sagendorph. The following list of inspectors are wanted: 200 inspectors of artillery ammunition; 40 each month of inspectors of forging, and indefinite numbers of inspectors of high-explosive shell loading, inspectors of ballistic tests, inspectors of powder and explosives, inspectors of artillery ammunition steel, inspectors of brass, copper and spelter, and inspectors of trench warfare materials; 300 engineers of tests of ordnance material; 15 metallurgical chemists per month, and 500 mechanical draftsmen, and an indefinite number of engineers of tests of ordnance material.

The J. J. Carrick, Inc., Buffalo, recently granted a charter for the manufacture of iron and steel products, has purchased the plant of the Militaire Motor Vehicle Co. at Clyde Avenue, Amherst Street and the Lackawanna Railroad, 80 x 350 ft., has let contract for an addition 80 x 200 ft., and will at once equip the enlarged plant for the manufacture of munitions.

The Smiley Steel Co. has established an office in Washington, D. C., at 202 Kellogg Building, 1422 F Street, N. W. It is representing the Greenville Steel Car Co., Greenville, Pa., engaged in car repair work, and also the American Steel Co. of Cuba, which is a builder of cars, and a steel fabricator with gantry cranes as a manufacturing specialty.

Cast Iron for Pistons and Cylinders

The use of gray cast iron for incorporation in pistons and cylinders of internal combustion engines was discussed recently by J. E. Hurst in a paper, "Gray Cast Iron," before a joint meeting of the Staffordshire Iron and Steel Institute (British) and the Birmingham branch of the British Foundrymen's Association.

He dwelt upon the liability of cast iron to grow when subjected to alterations of high and low temperatures. The growth, he said, was attributed to the oxidation of the constituents in the interior of the metal and varied according to the temperature, the character of the surrounding oxidizing atmosphere, and above all the structural arrangement of the constituents of the cast iron at high temperature. He exhibited the fracture of a common gray cast-iron water pipe which had been subjected to a temperature of 900 deg. to 950 deg. C., and in which the growth was practically negligible. The fracture showed an inner ring or core of gray graphitic iron surrounded on both sides by a ring of bright steely appearance. It was clear that the inner core had been protected from the influence of the oxidizing gases by the formation of the outer case of ferrite and thus prevented from growing. The pipe was originally heavily coated inside and out with brown rust and this was undoubtedly responsible for the original oxidation of the superficial graphite, forming the ferrite case, and protecting the material from growth. That suggested that the production of a decarbonized skin on the surface of cast iron might offer a means for the prevention of growth to any large extent.

In the manufacture of dies for die-casting and complicated chills, generally, Mr. Hurst recommended the employment of a high silicon iron, which would reduce the amount of annealing required to produce the deoxidized skin and also minimize the effect of the deposition of temper carbon, due to the dissociation of the pearlite carbon on expansion.

The cracking of piston heads in internal combustion engines was often attributable to mechanical defects, such as defective cooling arrangements and badly designed castings; but it might also be attributable among other causes to the temperature and since, in the Diesel engine the temperature (950 deg. to 1000 deg. C.), the phenomenon took the form of cracking rather than growth. Mr. Hurst considered phosphorus a dangerous constituent of gray cast iron for internal combustion engine pistons, and gave the following composition of a cast iron for all purposes; Combined carbon, 0.69 per cent; graphite carbon 2.87 per cent; total carbon 3.56 per cent; silicon 1.23 per cent; manganese 1.44 per cent; phosphorus 0.52 per cent.

He also suggested that alloy cast-iron pistons of the white-iron type might be employed with advantage and exhibited a specimen and micrographs of a chromium cast iron made for that purpose which, he said, had given satisfactory results.

Canadian Steel Merger

Reports have been renewed in the past week of negotiations for a merger of the Dominion Iron & Steel Co., Ltd., Sydney, Nova Scotia, and the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia. Frank H. Crockard, formerly vice-president of the Tennessee Coal, Iron & Railroad Co., is president of the Nova Scotia company.

A meeting of the Central Division of the American Board of Scrap Iron Dealers will be held at the Fort Pitt Hotel, Pittsburgh, March 5, with a view of extending the territory of this division to include dealers from Pittsburgh, Syracuse, Erie, Buffalo and Rochester, who are invited to attend this meeting.

The Mahoning plant of the American Sintering Co., Youngstown, Ohio, recently destroyed by fire, was rebuilt complete in 30 days. This company is contemplating an addition to its plant to cost about \$100,000, for which considerable new equipment will be needed.

PERSONAL

W. Vernon Phillips, chairman of the new Sub-Committee on Iron and Steel Scrap of the American Iron and Steel Institute, will devote almost his entire time



W. VERNON PHILLIPS

to his new duties, having severed his connection as an officer of the Perry-Buxton-Doane Co., Pennsylvania Building, Philadelphia. Mr. Phillips has been interested in the scrap business in one way or another for the past 17 years. He was born in Wales and came to this country when a boy, with his father, F. R. Phillips, whose object in coming to the United States was to help in establishing the tin-plate industry, his family being prominent among the tin-plate manufacturers. F. R. Phillips died in England, in 1903, and the business of the F. R. Phillips & Sons Co., importer and exporter of steel products, which he had established in 1883 in this country, was continued by his sons. In 1911, W. Vernon Phillips saw an opportunity to consolidate three old established scrap companies in New England—the William H. Perry Co., Providence, R. I.; the E. Buxton & Son Co., Worcester, Mass., and the George B. Doane Co., Boston—and the new company was called the Perry-Buxton-Doane Co. It is now one of the largest of the scrap companies in the East, maintaining branches in Boston, Chelsea and Worcester, Mass.; Portland, Me.; Providence and Pawtucket, R. I.; Hartford, Conn., and in New York and Philadelphia. When control of the scrap business was undertaken by the Committee on Steel and Steel Products of the American Iron and Steel Institute, Mr. Phillips was appointed secretary of the Sub-Committee on Iron and Steel Scrap. He is also a director of the American Board of Scrap Dealers. At the annual meeting of the American Iron and Steel Institute in Cincinnati last fall, Mr. Phillips read a paper on iron and steel scrap, which was the first time that old material had been made a subject for an address before the institute. Mr. Phillips has made a close study of the scrap business from an economic standpoint. It presents so many peculiar and interesting angles and admits of so many improvements in the method of its handling that Mr. Phillips looks for important changes in the operation of the business following the war as a result of the regulations now being effected by the institute's committee and the co-operation of the scrap dealers individually and through their associations and bureaus.

Frank E. Hulett, engineer of the ore and coal handling department of the Wellman-Seaver-Morgan Co., Cleveland, has severed his connection with this company, and at the annual meeting Feb. 19 resigned from the directorate.

Pope Yeatman, consulting engineer of New York, has been placed in charge of the non-ferrous metals department of the War Industries Board, according to an announcement of the Council of National Defense. Mr. Yeatman succeeds Eugene Meyer, Jr., who, although still a member of the raw materials division, has been detailed on special duty for the Secretary of War.

Robert H. McMaster, assistant general manager of the Steel Co. of Canada, will leave shortly for Washington to act on the new Canadian War Mission, of which Lloyd Harris of Brantford, Ont., is to be the head. The commission about to be formed will handle

Canada's affairs in the United States until the end of the war, and Mr. McMaster's work will be principally in connection with the iron and steel industry, in which capacity he will be the buying agent for the Dominion of Canada.

Wendell G. Wilcox has been appointed advisory engineer of the Powdered Coal Engineering & Equipment Co., Chicago. He was graduated from Syracuse University in 1906, and from Wisconsin, 1909. He has been in charge of research work at the University of Wisconsin, research chemist with the National Carbon Co., Cleveland, production engineer with the Cleveland Electro-Metals Co., and from November, 1914, was assistant superintendent of the Massena, N. Y., works of the Aluminum Co. of America.

H. S. Farish has resigned as secretary of the Founders' Association of Cleveland, to take charge of the stores at the Hog Island plant of the American International Shipbuilding Corporation.

Edward P. Quinn has resigned as foundry superintendent of the Turner & Seymour Mfg. Co., Torrington, Conn., and has been engaged as manager of the foundry department of the Bilton Machine Tool Co., Bridgeport, Conn.

O. A. Berger, president of Berger & Carter Co., owner of the Pacific Tool & Supply Co., San Francisco, left for the East a few days ago. He will spend about six weeks visiting the machinery people.

E. L. Maddox, formerly a manufacturer of chairs at Grand Rapids, and the past four years a resident of Sacramento, has been appointed manager of the Liberty Iron Works, Sacramento, Cal., to succeed John L. Jordan. The Liberty plant is building aeroplanes.

William J. Laffrey has been appointed district sales manager of the West Penn Steel Co., Brackenridge, Pa., with office in the Dime Bank Building, Detroit, succeeding George R. Fink, who has entered the United States military service.

The Curtiss Aeroplane & Motor Corporation, Buffalo, has added two members to its directorate: W. B. Stratton, of Toledo, and Allen Smith, of Niagara Falls. At a recent meeting of the board John Willys, of Toledo, was re-elected president and Wm. A. Morgan, of Buffalo, vice-president and general manager.

William Waring, who represented the Galion Dynamic Motor Truck Co. in the Philadelphia territory, is now identified with the Lakewood Engineering Co., Widener Building, that city, which purchased the Galion company.

The Pittsburgh Valve Foundry & Construction Co. announces that its Philadelphia representative, Charles Armstrong Anderson, Jr., has been appointed first lieutenant in the Ordnance Reserve Corps. He has been granted a leave of absence to assume his new duties and on his return will again be in charge of the same district.

Lee Chamberlain has been made sales manager of the Standard Fuel Appliance Co., Detroit. He was formerly industrial sales superintendent of the Detroit City Gas Co., and later commercial manager of the Lansing Gas Light Co., Lansing, Mich.

S. W. Brainard, formerly mechanical engineer, Cleveland Pneumatic Tool Co., superintendent Niagara Fire Extinguisher Co. and general superintendent Automatic Sprinkler Co. of America, has been appointed factory manager of the Borden Co., Warren, Ohio.

J. B. Phillips, for 11 years superintendent of the Borden Co., Warren, Ohio, has resigned to accept the factory management of the Nye Mfg. & Tool Co., 108 N. Jefferson Street, Chicago.

George S. Welker, formerly Pittsburgh representative of the Norton Co., Worcester, Mass., has resigned, effective March 1, to become Pittsburgh representative of the Abrasive Co., Philadelphia, manufacturer of abrasive grinding wheels.

W. H. Thompson, for many years prominent in the heavy electric traction work of the Westinghouse Elec-

tric & Mfg. Co., has resigned to accept the position of works manager of the Fairmont Mining Machinery Co., Fairmont, W. Va., maker of coal-mining equipment.

L. N. Ridenour, formerly with the Larkin Co., Buffalo, has become assistant sales manager of the Wellman-Seaver-Morgan Co., Cleveland.

L. E. Jolls, formerly factory superintendent of the Packard Motor Car Co., Detroit, has been appointed works manager of the Elizabeth, N. J., plant of the Duesenberg Motors Corporation.

OBITUARY

JAMES BRYAN, aged 56 years, consulting engineer and authority on street railway construction, with offices in the Park Bldg., Pittsburgh, died Feb. 20 at his home in the East End, Pittsburgh. Mr. Bryan went to St. Petersburg, Fla., in December for his health, and returned home only two weeks ago, but his condition became steadily worse. He was born in England, coming to America 23 years ago, and had resided in Pittsburgh ever since. He had charge of the erection of railways in many prominent cities in the United States, among his most notable achievements being the construction of the electric lines of the Pittsburgh, Harmony, Butler & New Castle Railway, the New Castle Railway Line, the Monongahela Traction Co. line, and the Indianapolis & Louisville Railway.

THOMAS E. DAVEY, for many years identified with industrial interests of Youngstown, Ohio, died in Columbus, Ohio, Feb. 20, after a long illness of Bright's disease. Mr. Davey spent nearly his entire life in Youngstown, but in 1912 he was appointed as Republican member of the State Board of Administration of Ohio, which was organized in that year. He was repeatedly appointed to that board, executing the duties of his office with marked efficiency. His latest reappointment was made only two weeks ago by Governor Cox, who went personally to the home of Mr. Davey that he might bestow the honor. Mr. Davey was active in the organization of the Finished Steel Co., at Youngstown, manufacturer of cold-rolled products, and was secretary and treasurer until he sold out his interests on Jan. 1, 1906.

GEORGE J. ALTHEN, treasurer the Driver-Harris Co., Harrison, N. J., died Feb. 15. Mr. Althen was born in Newark, N. J., Aug. 6, 1857, and was for many years engaged in the grocery business. For the past four years he had been connected with the Driver-Harris Co. and was well known through his affiliation with the National Credit Men's Association, being New Jersey's representative on the executive committee.

IRVING MCC. BEAN, Milwaukee, president Milwaukee Boiler Works and formerly assistant manager Northwestern Iron Co., at Mayville, Wis., died Feb. 18 after a short illness from pneumonia. He was 43 years of age and a native of Milwaukee. Mr. Bean was a graduate of the Universities of Michigan and Wisconsin.

Mr. Baruch Will Head War Industries Board

Although it is not officially announced, it is generally understood in Washington that Bernard M. Baruch of New York will be appointed chairman of the War Industries Board to succeed Daniel Willard, resigned. Mr. Baruch is now head of the raw material division of the Council of National Defense and is expected to have larger powers under the new reorganization plan now being carried out.

It is reported that the Buckeye Traction Ditcher Co., Findlay, Ohio, will build an addition to its plant and install an electric furnace to manufacture steel for its own requirements.

TAFT IS SELECTED

Ex-President Will Be a Member of the New Labor Conference—First Meeting

With the selection by employers' representatives of William H. Taft as one of two men to serve for the general public, the conference between spokesmen of capital and labor, which met at Washington Tuesday to frame the basis of a national labor policy, adjourned for a week to permit the workers to name the other member for the public. Mr. Taft wired his acceptance.

The conferees met at the call of the Government to arrive at an agreement governing their relations during the war. Five men were named by the National Industrial Conference Board and five by the American Federation of Labor, and they with the two representatives of the public will compose a board of twelve. Representatives of the workers named William Johnson of Washington, president of the Machinists' Union, to take the place of J. A. Franklin, president of the boilermakers, who was unable to serve on the committee.

The selection of Mr. Taft, officials said, would give prestige to the conference and impress on the public mind its importance. The labor representatives are expected to name a prominent man also, and it is said that Associate Justice Brandeis of the Supreme Court may be asked to serve.

When the conferees meet again a week from tomorrow each side will have ready a program and an outline of the subjects it thinks should be taken up. Aside from the desire to formulate a Government labor policy, the chief aim of the conference is to find a method of doing away with strikes which might hamper war production. It is believed that both sides will agree to some plan of arbitration, probably by district boards, with the right of appeal to a general board or department to be established under the Department of Labor.

The first selection of the men chosen to represent capital included Charles F. Brooker of Ansonia, Conn., president of the American Brass Co. Mr. Brooker's health prevented him from accepting appointment and H. B. Worden, president of the Submarine Boat Co., Newark, N. J., was chosen.

Loyall A. Osborne of New York, vice-president of the Westinghouse Electric & Mfg. Co. and one of the employers' representatives on the conference, in speaking of the outlook, said: "I don't think any of the men to meet have any idea how long it will take us to complete the program which has been arranged for us. We cannot very well hazard a guess. I am sure we are all anxious to bring the conference to a speedy and successful conclusion. That is what we are here for, and we have all come with open minds anxious to do whatever is best for our country."



L. A. OSBORNE

The American & British Mfg. Co., Bridgeport, Conn., in the Supreme Court, New York, Feb. 19, was awarded a judgment amounting to \$999,389 in a suit brought against Joseph H. Hoadley, the Cramp-Hoadley Co.; Alfred H. Hoadley, George E. Bouchie, William E. White and Alfred W. Bleasdale. The plaintiff maintained that the various defendants had unlawfully turned over to Joseph H. Hoadley and the Cramp-Hoadley Co. money, notes and accounts receivable. Joseph H. Hoadley was formerly president of the International Power Co., of which the American & British Co. was a subsidiary.

Safe Practices in Sheet Mills

Some of the measures adopted at the plant of the American Rolling Mill Co., Middletown, Ohio, to insure the safety of the employees were brought out in a paper by Frank E. Morris at the recent meeting of the National Safety Council in New York. In the sheet mill departments of this plant over 1100 employees are at work, and in the first six months of 1917 there were only 107 accidents that resulted in a loss of one day or more of time. In planning the safety features the company has had as its aim the making of working conditions absolutely safe.

Among the precautions are the installation of double rails around the acid vats in which the sheet bars are immersed and a suspended runway extending the entire length of the shaft driving the coal stokers supplying the heating furnaces. The hot scale is swept up by sweepers who are under the safety department. The sole duty of these men is to keep the floors clean, thus eliminating the danger of burning the feet, as well as overcoming the slipping hazard on a plate floor. For carrying packs of sheets a rectangular steel frame suspended from the mill crane with a large hook having two broad tapering toes dangling at each corner is used. The design of the hooks is such that when the load is lifted the resultant force is directly over the supporting base due to a curve in the hook at the top. These hooks and chains are changed every second day and the old set goes to the sheet mill blacksmith, who inspects every link and roughens the toes of the hook.

In connection with the handling of the sheets prior to their passing through a set of leveler rolls to flatten them, Mr. Morris spoke of the company's experience in securing a suitable protector for the forearm. Leather gauntlets were tried, but the men complained that these were too heavy, and various other materials were experimented with, including composition packing and cane woven cuffs, neither of which were satisfactory. Finally sheepskins with the wool outside were tried and these are giving satisfactory service, as they are light, pliable and impervious to cuts. In the galvanizing department a light weight face mask is used to protect the man whose duty it is to replenish the spelter in the hot metal pots. These were evolved with the cooperation of an optical house and can be worn on the top of the head when not in use and can be conveniently adjusted when needed.

Overman Bill Indorsed

WASHINGTON, Feb. 26.—A strong indorsement of the Overman bill, giving the President full powers to centralize control in any way he may see fit for the prosecution of the war, has been given by the board of directors of the United States Chamber of Commerce in a bulletin to the more than 1000 business bodies comprising its membership. This recommendation, it is said, is in line with the Chamber's action last September when it called for central control and responsibility for procuring war material and supplies.

"The development of an organization to bring about central control and responsibility for procuring war material and supplies has now reached a point where further progress cannot be had without action of Congress," says Waddill Catchings, chairman of the war committee of the Chamber of Commerce of the United States, in discussing the action taken with respect to the Overman bill. "However excellent the numerous plans of reorganization in the several departments are, they can be put into effect only when Congress grants the power."

E. M. Herr, president of the Westinghouse Electric & Mfg. Co., Pittsburgh, addressed the Cleveland Chamber of Commerce Feb. 19 on "Foreign Trade After the War." He predicted that a stable government would be established in Russia eventually, and with it would come a great industrial development that would make Russia a very important market for American products. He also referred to great possibilities for extension of American trade in Japan, China and South American countries.

The Annealing of Steel Castings

A German metallurgist, R. Durrer of Düsseldorf, Germany, has been publishing in *Stahl und Eisen* a series of articles on "The Practical Application of Metallography in the Iron and Steel Foundry." A translator in the *London Iron and Coal Trades Review* presents the following statement of the author's conclusions:

Steel castings can be improved materially by increasing the manganese content to about 0.80 to 1 per cent, the principal effect of which is to increase the strength and the ductility.

The improvement by annealing is relatively less in thin than in thick castings.

Annealing produces an outer skin with reduced carbon content, and consequently one of less hardness and less resistance to wear. In the case of castings of ordinary quality this skin is about 1 mm. (25.4 mm. = 1 in.) thick; in castings richer in manganese it is about 0.5 mm.

With annealing the characteristic texture in thick and the cellular texture in thin castings disappear and a pure granular texture is produced. This change in texture by annealing becomes less apparent in proportion to the decrease in the thickness of castings.

In the case of steel castings rich in manganese the texture is also changed by annealing, but in the author's experiments no uniformity in the grain could be attained, and patches of fir-tree pattern remained. The author thinks that by an improved method of annealing (as regards degree of temperature, length of period of heating, rate of cooling) manganese steel castings could be further improved.

Penn-Seaboard Corporation's New Plate Mill

Walter S. Bickley, formerly president of the Penn Steel Casting & Machine Co., Chester, Pa., and since the organization of the Penn-Seaboard Steel Corporation a vice-president of that company, has resigned from active duties. At a recent meeting of the board of directors of the Penn-Seaboard Steel Corporation Rodney Thayer was re-elected president of the company, C. E. Middleton and Henry J. Klaer, vice-presidents, and C. F. Jemison, secretary and treasurer. Mr. Bickley remains a member of the executive committee. Mr. Middleton is in charge of the ingot department and has his headquarters at New Castle, Del. Mr. Klaer is in charge of the steel casting department and has his headquarters in Philadelphia and Chester. He has had the title of general manager.

Work is being pushed upon the extensions to the capacity of the Baldt works at New Castle, which will be converted into a rolling mill. A large steel melting capacity was added last year and the building of a plate mill is in view of the great shipbuilding and structural operations in the Delaware River valley.

The directors of the company were re-elected at the annual meeting with the exception of F. Wilson Prichett, who is in the Federal service. He was succeeded by Robert K. Cassatt of the banking firm of Cassatt & Co.

Drop in Fabricated Steel Business

Only 53 per cent of the entire capacity of the bridge and structural shops of the country was put under contract in January, according to the records of George E. Gifford, secretary of the Bridge Builders' and Structural Society, 50 Church Street, New York. This corresponds to about 95,000 tons of steel work. It is to be compared with 205,000 tons, the total business done in December. Just as there was a decided drop two years ago at the culmination of the activity in the construction of munitions plants to take care of contracts with the Allies, so a decided drop occurred from December, 1917. Two years ago December showed a total of 205,000 tons and the contracting volume dropped to 119,000 tons in January, 1916, while the figures for the last two months are as stated, 205,000 and 95,000 tons.

REVISION OF TAX LAWS

Income Provisions Not to Be Changed Soon, but Amending Will Come Later

WASHINGTON, Feb. 26.—The project to secure the comprehensive revision of the excess profits tax provisions of the war revenue law in time to affect the returns for 1917 has been abandoned as the result of an arbitrary decision of the Commissioner of Internal Revenue. The law will be revised at the present session in all probability, but the work may not be undertaken before May or June. Additional revenue legislation which it has been thought would be initiated before March 1 will also be postponed until the early summer. Plans for revising the tariff as a part of the revenue measure which are being pushed by what appears to be a comprehensive organization will be sharply checked, for the present at least, and there is reason to believe will be strongly opposed by the majority leaders of both houses when brought forward later in the session.

According to the plans of those who were urging the revision of the excess profits tax provisions of the war revenue act, the bill reported to the House several weeks ago by the Ways and Means Committee making the salaries of Senators and Representatives subject to the excess profits tax was to be used as a basis for very comprehensive amendments amounting practically to a rewriting of the entire law. The work was to be done largely in the Senate Finance Committee, which already has before it a complete substitute for the existing law drawn by Senator Smoot of Utah, one of the most experienced members of the committee. It was also planned that the committee would receive from the Internal Revenue Bureau numerous suggestions for amendments framed by the Board of Excess Profits Tax Advisers, which, for three months, has been engaged in a study of the law with a view to determining the changes necessary to render it both intelligible and enforceable.

Plans Are Upset

These plans have been completely upset, however, by the Commissioner of Internal Revenue, who has rendered a decision holding that it was the intent of Congress that the salaries of Senators and Representatives should not be exempted from the excess profits tax. The commissioner's reasoning is far from convincing, from a legal standpoint; but inasmuch as no Senator or Representative is likely to have the hardihood to test the matter by insisting upon his individual exemption, the majority leaders are convinced that there is no further occasion for legislation on the subject and the bill framed by the Ways and Means Committee will therefore be permitted to die without further consideration.

Notwithstanding this radical change in plans, there is high authority for the statement that the excess profits tax is to be recast and that probably the revision will be made in connection with the new revenue measure to be passed before the end of the present session. The Board of Excess Profits Tax Advisers is still holding informal conferences with business men and has not yet finally framed the recommendations it will lay before the commissioner for changes in the law. The mining interests of the country, represented by a special committee which has had the subject under consideration for several months, have recently submitted to the Treasury Department a proposed amendment to the excess profits tax law intended to cover mines and oil and gas wells.

Plans to Increase Taxes

The national income from taxation is now approximately \$4,000,000,000 per annum, or about one-third the cost of the war and the current expenses of the Government exclusive of loans to the Allies. This is a larger proportion of war funds derived from taxation than any of the belligerent countries is now securing; nevertheless, the Secretary of the Treasury is under-

stood to take the position that somewhere between one and two billion dollars additional should be obtained from further taxation.

While no formal consideration has yet been given to the matter, unofficially members of both houses are already discussing four projects, viz., a moderate increase in corporation and individual income taxes, amounting in the case of individual taxpayers to the raising of surtax rates; a substantial increase in excess profits taxes, so graded as to obtain the bulk of the money from individuals and corporations enjoying a high degree of prosperity as a direct result of the war; the imposition of consumption taxes on such universally used commodities as sugar, tea, coffee, cocoa, etc., and increased customs duties, including the imposition of a flat rate of duty upon all the articles embraced in the existing free list.

New Method of Establishing Working Strength of Metals

What it has called the Useful Limit Point, or U. L. P., has been established by the committee on steel columns and struts of the American Society of Civil Engineers. The committee has not been convinced that existing definitions of proportional limit, elastic limit and yield point have made it possible to locate easily the limit where the metal ceases to have structural value. It therefore decided to do its own defining and has fixed "the critical point as the point which is determined graphically by drawing a line tangent to the envelope of the stress-strain curve, having a slope of one-half that of the last run-up line for its straight, or nearly straight, portion."

In the testing, much of which on full size specimens of columns was done by the Bureau of Standards, a falling off in strength of heavy sections of structural material was noted. On this, the report says: "The physical characteristics and strength of structural steel are affected by the amount of working which it receives in passing through the rolls, and, for the same size of ingot, the heavy material does not receive as much working as the light; consequently, for the same chemical composition, the heavier material is weaker."

The column committee as it has been called has been in existence nine years and the foregoing is a feature of its final report now available in printed form. Very definite statements are made that present mill processes do not produce a uniform steel and that present testing methods do not give a correct indication of the compressive strength of the material; a brief review is given in the subjoined. Lewis D. Rights, manager in New York for Lewis F. Shoemaker & Co., fabricators, was chairman of the committee and James H. Edwards, assistant chief engineer American Bridge Co., was a member.

Some large variations also were noted in the column tests in alternate strengths and U. L. P. The average U. L. P. of one series of light sections was 34,700 lb. per sq. in. and that of the heavy sections was 19,700 lb. The lower value was 57 per cent of the higher and there was a variation of 28 per cent from the mean. "These extreme variations may be abnormal," it is admitted, "but it must be remembered that the tests were made on material specially chosen, and supposedly the best that the mills could produce."

The committee regards it as unwise to assume a higher working stress than 12,000 lb. per sq. in. for columns in which the ordinary grade of structural steel (60,000 lb. ultimate tensile strength desired) is specified. "A large portion of the material which is classed as structural steel is furnished on the manufacturer's specifications, and, in view of the committee's findings, probably most structural steel is incompletely tested."

The adoption of a standard operating and cost system for motor trucks is to be one of the subjects of the National truck owners' conference which meets at the Hotel Astor, New York, March 7 to 9. H. P. Gould, Webster Building, Chicago, is director.

HOG ISLAND INQUIRY

Thorough Search for Facts Started by Assistant Attorney General

WASHINGTON, Feb. 26.—The investigation of the operations of the contractors at the Government-owned fabricated steel shipyard at Hog Island was inaugurated during the past week under conditions which promise an exhaustive inquiry and very prompt action if the allegations made by the officials of the United States Shipping Board are found to have been justified. By direction of the President, Attorney General Gregory has assigned Assistant Attorney General G. Carroll Todd to conduct the investigation on behalf of the Department of Justice and has detailed Mark Hyman of New York, special assistant to the attorney general, to aid him. A large contingent of the members of the Senate Committee on Commerce visited Hog Island yesterday and spent the day in a careful survey of the site and of the development work thus far accomplished.

The inquiry of the Department of Justice has been undertaken on an unusually broad scale. Mr. Todd, who is in charge of the work, is one of the most energetic members of the attorney general's staff and has had a wide experience in the examination of the operations of large industrial corporations. He was the attorney general's chief assistant in preparing and arguing the case brought against the United States Steel Corporation under the Sherman act and has served in a like capacity in several other anti-trust cases. Mr. Todd and Mr. Hyman have taken up the contracts made with the American International Corporation and the agreements with sub-contractors and are making a close study of them preliminary to a visit to Hog Island. In the meantime a large staff of accountants has been set at work upon the books of the Emergency Fleet Corporation and will later go to Philadelphia to examine the contractors' books for the purpose of determining whether unjustifiable expenditures of money have been made either by the Fleet Corporation or the contractors. In view of the fact that many of the expenditures criticised in the course of the investigation by the Senate Committee were undoubtedly authorized by the Fleet Corporation, that organization is quite as much on trial in this investigation as the contractors at Hog Island.

In addition to making a study of the accounts covering the Hog Island contracts the Department of Justice has detailed a corps of agents from the Bureau of Investigation who will go to the shipyard for the purpose of gathering general information as to the conditions there. This branch of the inquiry will be conducted confidentially and without soliciting the co-operation of the representatives of the contractors. These agents will go to Hog Island this week.

Following their visit to Hog Island the members of the Senate Commerce Committee will hold an executive session at which will be mapped out an additional line of investigation and will probably examine a considerable number of new witnesses including officers of the contracting corporations and a number of their employees.

Electrometallurgy in Canada

Discussing the subject of electric smelting in an address at the recent annual meeting at the Commission of Conservation, Sir Clifford Sifton said that there are, at the present time in Canada, 32 Heroult electric furnaces and 22 of other types—54 furnaces in all, with a capacity of 173,000 tons of iron and steel, 50,000 tons of ferrosilicon, and 8000 tons of other ferroalloys per annum.

The Canadian Car & Foundry Co. has a contract to build at its Fort William, Ont., plant 12 steel vessels to be used as mine sweepers by the French Navy. The contract involves roundly \$2,500,000.

ACUTE FUEL CONDITIONS

New England Still Suffering from Shortage of Coal and Oil

BOSTON, Feb. 26.—The coal situation is as acute as ever and the fuel oil shortage has been but little relieved. The Remington and Union Metallic Cartridge plants at Bridgeport, Conn., would have been compelled to shut down to-day for lack of coal if a bargeload of coal had not been secured by emergency measures from New York. Other factories will suffer because of the necessity of keeping these huge munitions plants going. In Boston last Saturday, the coal situation was more acute than any day this winter, as only 25,000 tons of coal were on hand in a city using 40,000 tons a day. A few places report a decided betterment of the coal supply, but these are only a small minority.

Formation of new metal-working companies and projects for new plants or additions have decreased to the lowest point for three years. So many difficulties are now confronting the industry in this section that this condition is not likely soon to change. New capital issues are being discouraged and there is little incentive to increase plants with a shortage of every essential necessary for their operation.

Distinct labor troubles are few now, but threats of further trouble are in the air and some unrest is noticeable. About ten days ago, the machinists' union of Bridgeport voted to establish a new scale of 85 cents an hour minimum to go into effect Feb. 15, with a rate of \$1 an hour to be established May 1. The new 85-cent minimum was to have started in the Remington plant, but it did not and never will unless the machinists find a way to enforce their demands. The manufacturers are preparing to fight their demands and have notified various Government agencies of the pending trouble. In Worcester, Mass., trouble is threatened over the discharge of the president of the local machinists' union from one of the factories, but it is doubtful whether the union is prepared to force the issue at this time.

The Lord Construction Co., New York, is preparing to take over 1000 ft. of the municipal dock at Field's Point, Providence, R. I., for the purpose of fitting out the wooden vessels to be built for the Emergency Fleet Corporation. The company will do everything to transform an empty wooden hull into a sea-going vessel. Between 500 and 600 men will be employed and the company is planning to house its men near the plant.

Iron and Steel of Canada is a new trade journal of which Vol. I, No. 1, has just been issued at Montreal by the Industrial & Educational Press, Ltd. While it is announced that the journal is independent, it is also stated that the Canadian Mining Institute, which has had under consideration for some time the publication of a journal, will co-operate with the publishers. Dr. Alfred Stansfield, professor of metallurgy at McGill University, is editor, and W. G. Dauncey, who recently resigned as consulting metallurgist to the Canadian Steel Foundries to establish an engineering office in Montreal, is associate editor. A feature of the first number is an extended paper by Corbett F. Whitton on "The Present Position and Future of the Iron and Steel Industries in Canada." In general the contents of the first number indicate that prominence will be given to the metallurgy of iron and steel. An editorial article deals with the shortage of steel scrap in Canada, which is spoken of as rapidly becoming acute. The remedy suggested is an increased production of pig iron, which can only come out of improved fuel conditions.

The Trumbull Steel Co., Warren, Ohio, plans to place a portion of its open-hearth plant in operation about March 10. This consists of seven 100-ton open-hearth furnaces, a 36-in two-high blooming mill and an 18-in. sheet-bar and billet mill. The mill equipment will probably not be ready for operation before July. In the meantime, the ingots will be disposed of on the market.

IRON AND STEEL IMPORTS

Movement Can Not Be Curtailed Under the License System

WASHINGTON, Feb. 26.—Serious difficulties are being encountered by the Government in its efforts to secure the release of a substantial amount of shipping by curtailing importations through the medium of license requirement. Urgent as is the need to increase the Atlantic transport service for troops, war material and food, a careful survey of current importations made during the ten days since the President's proclamation of Feb. 14 became effective has failed to show where any worth-while gains can be made by shutting out from our ports goods of foreign origin. So far as consideration has been given to iron and steel, and in fact to the entire metal schedule, it does not appear that so much as 2 per cent can be wisely cut off, nor can a single ship be gained by any limitations upon this class of imports.

Imports for Twelve Years

The monthly statistical tables which have appeared in THE IRON AGE covering imports of iron and steel have been limited to tonnage commodities, and, as these include but a few items, the impression has gained ground, even among those familiar with this particular trade, that general manufactures of iron and steel have shared in the increase that has marked the entire import trade. It is only necessary, however, to consider the figures embraced in the table presented below to reach the conclusion that manufactured products have followed the general downward tendency noted in the imports of basic products. This table gives the total value of all imports of iron and steel for the past 12 years:

Imports of Iron and Steel by Values

Imports		Imports	
1906.....	\$34,827,132	1912.....	\$29,328,709
1907.....	38,789,992	1913.....	33,601,222
1908.....	19,957,385	1914.....	28,642,862
1909.....	30,571,542	1915.....	20,380,093
1910.....	47,115,112	1916.....	27,986,951
1911.....	28,995,600	1917.....	25,881,954

Effect of Tariff Legislation

It would be difficult to find statistics showing more graphically the effect of the war upon any industry than is shown by this short table. The influence of tariff legislation is also clearly reflected. The agitation which preceded the passage of the Payne-Aldrich law, in 1909, which substantially reduced the protective rates of the Dingley tariff act, served to reduce importations in 1908; but there was a strong reaction when the lower rates became effective, and in 1910 imports rose to high-water mark, exceeding \$47,000,000. In 1913 the rates of the metal schedule were subjected to heavy cuts by the Underwood-Simmons tariff act, the iron and steel imports of the year exceeding those of either 1912 or 1911. For the last five months of 1914, however, war conditions prevailed, and the anticipated increase in imports did not materialize. In 1915 the total sank to the lowest point since 1908, and, while there has been an apparent reaction during the past two years, the gain in the total value of iron and steel imports has probably been less than the increase in prices; in fact, where the official returns show units as well as values an actual decrease is noted.

Turning to imports of tonnage commodities for 1917, it is interesting to note that, of the 330,000 gross tons received during the year, more than 282,000 tons were comprised of four items—viz., scrap, 180,034 tons; ferromanganese, 49,381 tons; steel billets without alloys, 35,860 tons, and all other pig iron, 21,665 tons. Of no other commodity did the imports for the year amount to 10,000 tons. Considering these figures in connection with the imports of the past dozen years, it is not surprising that the War Trade Board can find no

opportunity for curtailment of imports in the iron and steel schedule.

Cannot Gain Vessel Tonnage

The situation with respect to all other metals is quite as discouraging to those who are seeking an opportunity to cut off importations with a view to releasing ships for war service. In this connection, the experts are obliged to bear in mind the important fact that the shutting out of imports of a certain class will not serve to release cargo vessels unless such vessels are exclusively employed in handling the goods which it is proposed to restrict. This principle applied to our general import trade has well nigh shattered the hopes of the authorities to make any substantial gain in shipping as the result of the adoption of the import license policy. Nothing is to be gained, for example, by excluding a nonessential which loads economically with other products which are necessary for war purposes.

Manganese, the imports of which it has been erroneously reported the War Trade Board has been planning to restrict, is now chiefly imported from Brazil, and it can be stated that every effort will be made to stimulate these imports rather than to curtail them. Copper and lead are also war essentials the imports of which not only cannot be curtailed but necessarily bring with them other commodities less important from a war standpoint, but which go to make cargoes.

British Steel Exports and Imports at Low Ebb in 1917

British exports of steel for 1917 were less than in many years. The total, exclusive of iron ore and scrap, was only 2,345,592 gross tons, about 1,000,000 tons less than in 1916, when they were 3,356,339 tons. The larger part of the year's decline took place in the last quarter, when each month's exports were less than those for any preceding month of the year. The quarter's total was 447,795 tons against an average of over 600,000 tons for the other preceding quarters.

Pig-iron exports in 1917 were 639,339 tons against 789,406 tons in 1916 and 508,289 tons in 1915. Ferro-alloy exports, largely ferromanganese, were less in 1917 than in many years, the total being 94,437 tons as compared with 127,401 tons in 1916 and 102,938 tons in 1915.

Rail exports have continued their downward trend until they are now insignificant. The 1917 total was only 39,183 tons, against 54,403 tons in 1916 and 242,267 tons in 1915. In 1913 these exports were over 500,000 tons.

Steel-bar exports have continued large relatively. In 1917 they were 428,445 tons, as compared with 617,117 tons in 1916 and 489,191 tons in 1915. Tin-plate exports have declined decidedly in the past year. They were only 177,218 tons in 1917. In 1916 they were 321,654 tons and in 1915, 368,778 tons. In 1913 they were 494,497 tons.

Imports of iron and steel declined to a very low level in 1917. The total was only 496,816 tons. This contrasts with 772,846 tons in 1916 and with 1,290,603 tons in 1915. Before the war they were 2,343,173 tons in 1913. The 1917 imports were therefore only about one-fifth of the pre-war level.

Imports of steel blooms, billets and slabs in 1917 were only 59,312 tons while in 1916 these were 146,032 tons and in 1915 they were 427,996 tons. These figures indicate the extent to which Great Britain's steel output has expanded.

It is expected that the blast furnace at Rusk, Tex., recently acquired by the Texas Steel Co., Beaumont, Tex., will be blown in in April. Repairs have been nearly completed, apart from the installation of the Hunt filling system. Iron ore will be brought from deposits which are within 3 miles of the furnace. Limestone will come from Texas quarries, the haul being about 100 miles. Alabama coke will be used.

TRADE WITH NEUTRALS

Arrangements for Exporting to Holland, Denmark and Scandinavia

WASHINGTON, Feb. 26.—In working out a policy for the treatment of Holland, Denmark and the Scandinavian countries with respect to rationing them with necessary commodities on a basis that will supply their immediate requirements but that will prevent re-exportations to the central powers, the War Trade Board has materially relaxed the practical prohibitions heretofore in force. The concessions made include the licensing of a number of important articles to Holland and Sweden, and the agreement to provide Norway with limited amounts of certain essential metals. These concessions, however, do not relieve exporters of the necessity of procuring licenses for all shipments to the countries mentioned.

It has not yet been possible to determine how far the Allies can safely go in permitting goods to be shipped to the contiguous neutrals, but the War Trade Board announces that hereafter it will consider applications for licenses to export a specified list of articles to Holland and Sweden, although it does not give assurances that all such applications will be favorably acted upon. These commodities are not subject to the general rationing agreements now under discussion with the contiguous neutrals, which are not yet ready for promulgation. Holland and Sweden have already concluded temporary agreements of a limited character with the United States, and it is in view of this fact that this step, in which Great Britain and France join, has just been taken. The articles for which applications for export licenses will be considered embrace machinery, including spare or replacement parts, "ferrie compounds," presumably ferro-alloys, and a rather extensive list of other articles of no special interest to readers of THE IRON AGE.

Both Holland and Sweden are said to stand greatly in need of machinery which they have not been able to import from the United States for many months, and of which they purchased considerable quantities prior to the time that this country became involved in the war. Manufacturing in many lines has been carried on at maximum speed in both Holland and Sweden during the past year and much machinery in those countries is now worn out and needs spare parts or complete replacement.

In the case of proposed shipments to Holland, the prospective importer abroad must first obtain a Netherlands Overseas Trust import permit. When this is received he will advise the seller in the United States, who will thereupon apply for an export license from the Bureau of Exports, War Trade Board, 1435 K Street, Washington, D. C., using application Form X, and giving on his application the number of the N. O. T. import permit. No applications which do not give the N. O. T. permit number can be considered.

In the case of proposed shipments to Sweden, the prospective importer abroad must first make known to the United States Legation at Stockholm his intention to import, and advise the seller that he has done so. After he has done this the American exporter should then apply for an export license from the Bureau of Exports of the War Trade Board.

Hereafter British letters of assurance to Sweden and Holland will no longer be issued by the British Government for shipments covered by licenses dated Feb. 20, 1918, or later.

In considering applications for export licenses preference will be given to shipments ordered prior to July 9, 1917, and in making applications shippers should give any particulars of this character which might assist the board.

As all applications for shipments to Holland and Sweden must be passed on by the Washington office of the War Trade Board, shippers are requested to mail their applications direct to Washington and not to a branch office.

Pursuant to the pledge recently given by the War Trade Board to the Norwegian mission that Norway's reasonable requirements of certain metals would be met by the United States, the board has undertaken to state tentatively the quantities that can be spared after giving due consideration to the necessities of the United States and the Allies. Iron and steel are not under consideration in this connection.

The limit on the exportation of lead to Norway during the calendar year 1918 is fixed at 1,000 tons; the amount of tin is limited at 80 tons; antimony to 12 tons and asbestos to 350 tons. No specific limit has been adopted as to copper, but so far as the war needs of the United States and its associates permit, the board will assist in every way in supplying the copper needed by Norway. The board agrees to Norway's export of copper to the Central Powers only in compensation for copper received from those powers in manufactured form, plus 5 per cent to cover wastage.

Among the products which the War Trade Board will not permit to be exported to the Central Powers by any of the contiguous neutrals are antimony, bismuth, manganese, mica, nickel, tin, titanium, wolfram and chrome, and this includes all ores and alloys of the commodities mentioned.

Sociological Work a Factor in the Labor Problem

By surrounding its employees with helpful and inspiring influences while at work, at home and during leisure hours the Ellsworth Collieries, Ellsworth, Pa., has developed their social well-being in an effort to create a correct psychological attitude which will result in a willing performance of a full day's work on the part of each man. An outline of the work accomplished was given at the New York meeting of the American Institute of Mining Engineering, Feb. 18-22, by E. Bach, sociological director for the company.

The philosophy of sociological work was outlined, and detailed statements were made of the various channels through which the company reached its largely foreign-born employees and their families. Its welfare scheme is based on the voluntary participation of the workers in the advantages it offers them. It includes dressmaking work for foreign married women, homemaking science for girl employees, courses in English for adult foreign workmen, the support of brass bands, glee clubs and stringed instrument organizations of various kinds and nationalities, supervision of athletic sports, maintenance of playgrounds, and a careful oversight of social clubs for officials and workers, as well as auxiliary organizations, such as women's clubs, boy scouts, campfire girls and various foreign national societies.

Although its works are located in the mining towns of Ellsworth and Cokeburg, where no licensed saloons or "speak-easies" can be found, it faces a drink problem due to excessive drinking at clubs or at home. Through a special arrangement with the breweries, the company adopted a regulation for the distribution of beer, covering a period of 2½ years, through its sociological department. The plan was as follows:

A man was employed in each town, whose duty it was to receive orders and money for beer from employees. He transmitted the order in person to the brewery from which the employee ordered it. The plan was that of controlling the quantity sent to each home and minimizing the excess quantities which featured in weddings, christenings and holidays.

The result was not so satisfactory as had been anticipated, for the reason that it was soon discovered that whiskey was brought into the town surreptitiously, and that if a man did not get as much drink as he wished in the home he had only to go to a nearby drinking club with which he was familiar. The quantities were reduced, however, as the records show. Later, the men themselves decided to establish such departments under the supervision of their local union. This has only started, and no report can be made at this time concerning the movement. It is hoped that results will be satisfactory, and for this reason the company is lending assistance whenever desired.

Machinery Markets and News of the Works

BUYING IN WASHINGTON

Government Departments Order Tools

Much More in Prospect—Fair Activity in Various Market Centers

Purchases of machine tools and allied equipment in Washington are running into large figures, with much more to come. More and more machinery companies are establishing resident representatives in the capital to look after their interests. The General Engineering Depot is placing large orders for tools for portable repair shops for service in France. The Bureau of Steam Engineering, Navy Department, is buying tools for naval repair ships. The Washington and Norfolk Navy Yard will buy extensively for new shops. Every merchant ship will be provided with a repair shop equipped with several machine tools. It is estimated that thousands of tools will be bought in Washington within the next few months.

In machine-tool markets, there is a fair degree of activity, with many new projects pending. In Chicago there has been large buying by the Standard Steel Car Co., Hammond, Ind., which still has considerable to do. In Cleveland the principal buying has been done by the American Clay Machinery Co., Bucyrus, Ohio. The Glenn L. Martin Co., Cleveland, which will build airplanes, will issue a new list in about a month or two.

The largest buying in the East has been done during the past week by the Savage Arms Corporation, Utica, N. Y., whose total purchases will aggregate several hundred tools. The Worthington Pump & Machinery Corporation will make pumps for the submarine destroyers to be built by the Ford Motor Co., Detroit, in its Harrison, N. J., plant, the original plan having been to make them in the Deane works at Holyoke, Mass. Purchases for the Harrison plant will not be

as large as were contemplated for the Deane works.

The Regal Motor Car Co., Detroit, has been awarded a contract for 300,000 3-in. shells, which will be made at Jamestown, N. Y.

The United Verde Copper Co., Clarksdale, Ariz., has sent a list of about 50 tools to New York dealers.

The Brazilian Mission, now in the United States, has authorized the Allied Machinery Co., New York, to buy tools and other equipment for a government arsenal to be built at Rio de Janeiro. Purchases are now being made.

Two new shell-loading plants may be built in the East, one by the Atlantic Loading Co., 71 Broadway, New York, and the other by the T. A. Gillespie Co., 50 Church Street, New York. If the negotiations are completed these companies will buy cranes, hoists and tools.

The Thompson-Starrett Co., New York, has awarded an order for 49 2-ton hand-power cranes and 21 hoists to J. N. Kinney, New York, for the Government powder plant now being erected by the Thompson-Starrett Co.

A gradual spread of sub-contracts from Government plants and from the private plants having direct Government orders is responsible for a greatly increased activity in the New England machinery market. Reports agree that the number of New England machine tool and small tool plants buying additional equipment is considerably increased over the preceding weeks, and the new demand is for practically every kind of tool. Most of these orders are plainly for the purpose of balancing equipment for new work, and this movement is expected to continue for some weeks to come. Business with the machine tool plants continues at the same high pitch of past weeks and there is no evidence that the end is in sight.

Considerable miscellaneous business, in addition to the more important items above, is noted in the reports from various market centers.

New York

NEW YORK, Feb. 26.

A considerable volume of miscellaneous buying is being done in the machinery and machine-tool market, practically all of which is directly or indirectly for war purposes. Several large orders have been placed by the Savage Arms Corporation, Utica, N. Y., this business having been the feature of the week's buying. The total number of machines to be purchased runs into the hundreds. Next in importance comes the buying being done by the Worthington Pump & Machinery Corporation for its Harrison, N. J., works. The contract this concern has received from the Navy Department for pumps for the submarine destroyers being built by the Ford Motor Co., Detroit, has been assigned to the Harrison plant, though plans were at first made to build the pumps at the Deane works at Holyoke, Mass.

It was expected that the Duesenberg Motors Corporation, Newark, N. J., which has a contract to build 2000 Bugatti airplane motors, would come into the market for considerable new tool equipment, but it has been decided to move the needed equipment from the Fiat automobile plant at Poughkeepsie, N. Y., and the Duesenberg purchases will, therefore, be light. The machine-tool trade has been eagerly awaiting purchases by the Aeronautical Engine Co., Long Island City,

N. Y., formerly the General Vehicle Co., but there is nothing to indicate as yet when the Government, which now owns the property, will increase the equipment. A small order for Gnome motors was recently received to keep the plant busy until it is definitely determined to what use it shall be put. In all probability a large number of airplane engines will be built there eventually.

The Regal Motor Car Co., Detroit, has been awarded a contract by the Government for 300,000 3-in. shells, and will do the work at Jamestown, N. Y. A new building may be erected, for which new equipment will be required.

The General Electric Co., Schenectady works, is reported to be preparing another list of machine tools soon to be bought. A number of inquiries has been sent out. The Connecticut Brass & Mfg. Co., Waterbury, Conn., will buy a list of tools for a new addition. The Liberty Ordnance Co., Bridgeport, Conn., is buying on a small list. The S K F Ball Bearing Co., Hartford, Conn., has bought a number of grinders. Lupfer & Remick, engineers, Brooklyn, want several tools for prospective Government work. The Gas Defense Plant, Long Island City, N. Y., will buy drilling equipment for the manufacture of gas masks. The Metropolitan Engineering Co., Brooklyn, is buying a few tools for work on munitions. The Standard Roller Bearings Division of the Marlin-Rockwell Corporation, Philadelphia, has withdrawn a list of tools it recently issued. Plans made for the manu-

facture of machine guns in the Philadelphia plant have been changed by the Government.

There are indications that the Pennsylvania Railroad may come into the market soon for considerable equipment for locomotive and car shops and repair shops, though no definite inquiries have yet been made.

The United Verde Copper Co., Clarksdale, Ariz., has issued a list of about 50 tools and machines for mine repair shops, including a blacksmith shop. The Beaumont Shipbuilding & Dry Dock Co., Beaumont, Tex., is advertising for a large list of equipment wanted for shipbuilding.

The Hay Foundry & Iron Works, Newark, N. J., is building an addition to its plant and will soon require cranes and equipment for fabricating steel. Charles E. Haas, 50 East Forty-second Street, New York, has bought eight punching machines for export to France, where they are to be used for making mine dump cars.

The Brazilian Mission, now in the United States, has arranged with the Allied Machinery Co., 120 Broadway, to make purchases of machine tools and other equipment for a Government arsenal to be built at Rio de Janeiro, Brazil.

A large amount of buying is being done by various departments in Washington and an increasing number of machine-tool and machinery manufacturers are maintaining resident representatives at the capital to look after this business. The General Engineering Depot, 1438 U Street, Washington, is placing orders for a large number of machine tools for portable machine shops. Six-ton automobile trucks are to be fitted up with various tools, a welding outfit and a small power plant for the repair of equipment in the field. The Bureau of Steam Engineering, Navy Department, Washington, is placing orders for tools for naval repair ships. The Washington Navy Yard will soon issue a large list of tools for a tool-making shop which is now being built. Bids were opened on Feb. 25 for about \$600,000 worth of cranes for the Washington Navy Yard. The Navy Yard at Norfolk, Va., will also soon buy a large number of tools. Every merchant ship built in the United States is to have its own machine shop and many of these orders will be placed in Washington. The Federal Shipbuilding Co., Kearny, N. J., has placed an order with a New York machinery company for complete repair shops for the 10 ships it is building.

Two new shell-loading plants will probably be established in the East at the behest of the Government. The Atlantic Loading Co., 71 Broadway, is to have charge of one and the T. A. Gillespie Co., 50 Church Street, will build the other at Morgan, N. J. Both of these companies will be in the market for cranes, hoists and machine tools.

The Air Nitrates Co., New York, a branch of the Ordnance Department, United States Army, which has charge of the plant being built at Muscle Shoals, Ala., for atmospheric fixation of nitrogen, is buying conveying and crushing equipment, cranes and hoists. It is reported that another plant duplicating the one at Muscle Shoals is to be built, which will involve the purchases of other cranes.

The Submarine Boat Corporation, Newark, N. J., after figuring with several companies on a fitting-out crane for its shipyard, decided to build one in the shops of the Lackawanna Bridge Co. The Thompson-Starrett Co., New York, which is building a powder plant for the Government, has purchased 49 2-ton hand-power cranes and 21 hoists of J. N. Kinney, 30 Church Street, New York. This company is also in the market for a 75-ton power house crane and four mono-rail grab-bucket hoists. The Virginia Shipbuilding Corporation, Alexandria, Va., has bought two 5-ton cranes from the Bedford Foundry & Machine Co., Bedford, Ind. The Sun Shipbuilding Co., Chester, Pa., placed an order with the Toledo Bridge & Crane Co., Toledo, Ohio, for two 10-ton electric shop cranes. The Consolidated Rolling Mills & Foundry Co., 25 Broad Street, New York, wants one 15-ton and one 5-ton cranes for export. The Lone Star Shipbuilding Co., which has opened an office at 111 Broadway, New York, is seeking a 5-ton locomotive crane for shipyard work. The Metal & Thermit Corporation, 120 Broadway, New York, is in the market for a 5-ton hand-power crane.

The Hilliard Clutch & Machinery Co., Elmira, N. Y., has purchased property at Railroad Avenue and West Fourth Street to provide for the future expansion of its plant. There is no certainty that the company will begin construction immediately upon new building, its decision to build depending upon the demand for a new type low-priced automobile clutch which it has designed. V. R. Bruce is manager.

The Duesenberg Motors Corporation, manufacturer of internal combustion engines, 120 Broadway, New York, has purchased the plant and equipment of the Fiat Co., at Poughkeepsie, N. Y., for a cash consideration of approximately \$400,000. It has a contract with the United States Signal Corps for the production of 2000 large aviation engines known as the Bugatti. It is building an addition to its plant at Elizabeth, N. J., which was completed only last September, and is installing the machinery from the Fiat plant in its other original plant there, turning this building

into a machine shop and using the new building for assembling, testing and heat treating. In addition, the Fiat equipment will give it approximately 700 more machine tools. Sub-contracts for considerable work have been let with other engine builders, but all the assembling and testing will take place at the Elizabeth plant. The Fiat Co. is going to utilize a small portion of the Poughkeepsie building to take care of its service requirements and complete the assembling of its 1918 season's cars. Plans of the corporation do not contemplate the use of the Fiat plant for the manufacture of engines. No definite plans in fact have been made as to its use. Approximately 250 machine tools were available for instant use.

The Hurlburt Motor Truck Co., Third Avenue and Harlem River, New York, is planning for expansion of its operations to effect a total production of about 1,800 motor trucks this year.

The Liberty Aeroil Burner Co., New York, has been incorporated with a capital of \$200,000 by L. B. Appleton, V. J. O'Farrell and R. McMahon, 432 West 124th Street, to manufacture burners.

The Aeronautical Equipment Co., New York, has been incorporated with a capital of \$5,000 by M. Harley, I. and C. A. Ludlow, 233 Broadway.

The Aero Instrument Corporation, New York, recently incorporated with a capital of \$500,000, has leased property at 310 Hudson Street for a works. Initial operations will be devoted to the manufacture of altimeters for the Government. N. W. Walker, 94 Park Avenue, and J. W. Lovell, 516 Fifth Avenue, are the incorporators.

The Consolidated Zinc & Smelting Co., New York, has been incorporated with a capital of \$3,000,000 to operate a smelting works. J. A. Webb, I. M. Putnam and R. L. Smith, Pittsburgh, are the incorporators.

The Schleif Iron & Steel Corporation, New York, has been incorporated with a capital of \$30,000 to manufacture iron and steel products. R. N. Chambers, J. French and H. H. Graff, 59 Wall Street, are the incorporators.

Fire, Feb. 20, destroyed the plant of the Bayport Barrel Co., Bayport, L. I., with loss of \$10,000. Clarence E. Hibbard is president.

The New York Drydock & Transportation Co., South Front Street, Elizabeth, N. J., has had plans prepared for a two story extension to its machine and repair works, 30 x 50 ft. August L. Alpers is secretary and treasurer.

The Diehl Mfg. Co., Trumbull Street, Elizabeth, N. J., manufacturer of electric fans and motors, has had plans prepared for a four-story building, 60 x 300 ft., with wing, to cover an entire area 180 x 300 ft., at 810-50 Frelinghuysen Avenue, estimated to cost \$100,000.

The Submarine Boat Co., Port Newark Terminal, Newark, is building a series of power houses between its different shipways, consisting of three plants between ways No. 1 and 2, No. 3 and 4, and No. 5 and 6, respectively. Two steel fabricating shops are now nearing completion.

The New Jersey Metal Products Co., East Orange, N. J., has been incorporated with a capital of \$100,000 by Harry H. Picking, Charles O. Geyer and L. Matthews, East Orange.

The Ward Copper Co., Chatham, N. J., has been incorporated in Delaware with a capital of \$250,000 to operate a copper works. W. J. Downes and L. A. Irwin, Chatham; and F. G. Downes, Jersey City, are the incorporators.

Fire Feb. 18 destroyed three mills at the powder works of the Wayne Powder Co., Wayne, near Little Falls, N. J., consisting of electrically operated mixing mill, and No. 1 and No. 2 wheel mills, with loss reported to be about \$100,000.

James Hislop, Troy, N. Y., operating a foundry, has acquired the Tim Estate factory along the tracks of the Union Railroad, consisting of about 90,000 sq. ft. of floor space, and will use it as an addition to his plant.

The Atlas Powder Co., 120 Broadway, New York, has commenced the construction of a new nitrate works near Perryville, Md., at the mouth of the Susquehanna River, at an estimated cost of over \$5,000,000. Operations are to start by July 1 and will give employment to about 1000 hands. The production will be nitrate for Government use.

The Federal Enameling & Supply Corporation, Long Island City, N. Y., has been incorporated with a capital of \$500,000 by G. F. Demarest, 221 West Seventy-eighth Street; F. J. Lumsden, 144 West Eightieth Street, and M. MacKay, 9 East Fortieth Street.

The Oliver Loading Co., New York, has been incorporated in Delaware with capital of \$500,000 to manufacture loading machinery. B. Howard, G. V. Reilly and A. W. Britton, 28 Nassau Street, are the incorporators.

The Hudson Foundry, New York, has been incorporated

with a capital of \$20,000 by J. C. Garrett, J. B. Stucky and J. Mittleman, 27 William Street.

The Mondial Steel & Tool Co., New York, has been incorporated with a capital of \$100,000 by J. J. Oldak, 42 West Seventy-sixth Street; E. G. Delaney and M. H. Rothstein, 132 Nassau Street.

The A. W. Moyer Co., New York, has been incorporated with a capital of \$50,000 to manufacture machinery. M. Roger and W. P. Moran, 433 West Fifty-seventh Street, are the incorporators.

The Lowenstein Radio Co., Inc., New York, has been incorporated with a capital of \$500,000 by F. Lowenstein, 397 Bridge Street, Brooklyn; H. G. Wilson, 233 Broadway, New York; and A. Harris, Newark, N. J., to manufacture wireless apparatus.

The American Life Savers' Mfg. Co., New York, has been incorporated with a capital of \$50,000 by P. McCartin, M. Watson and M. Parisi, 42 King Street, to manufacture scientific instruments.

Catalogs Wanted

The Parket Unit-System desires to receive catalogs, quotations and other information relative to keyed lathes of various dimensions, diamond steel mesh, expanded metal, wire mesh, and cold-rolled rounds and squares, especially $\frac{1}{4}$ in. in diameter. Communication should be addressed to A. C. Dauchy, 10 Wall Street, New York, in care of Arthur Barnett, engineer.

Buffalo

BUFFALO, Feb. 25.

A large number of the metal-working plants at Syracuse are devoting operations to the production of materials for the Government. The New Process Gear Corporation is manufacturing large quantities of gears for airplanes; the Brown-Lipe-Chapin Co. is manufacturing an average of 2000 differential gears per day; the Brown-Lipe Gear Co. is producing daily about 1000 transmission parts for motor cars; the H. H. Franklin Mfg. Co. is largely engaged in the manufacture of parts for the Rolls-Royce airplane engine, cutting down its production of automobiles to a total of about 25 cars per day. Others locally engaged on war work are the Globe Malleable Iron & Steel Co., the Central City Wheel Works, the Chase Motor Truck Co., the M. L. Oberdorfer Brass Co., and the Dyneto Electric Corporation, Wolf Street. Smith Wheel, Inc., has taken over the plant of the Syracuse Malleable Iron Works, 101 North Geddes Street, and is now manufacturing hollow metal wheels for motor trucks. It is said that a total of about 10,000 men are engaged at local plants producing iron and steel supplies for war.

The Oneida Community, Ltd., Kenwood, N. Y., manufacturer of metal traps for hunting, silverware, etc., has increased its capital from \$2,300,000 to \$2,800,000.

The Atlas Drawn Steel Corporation, Dunkirk, N. Y., has been incorporated with a capital of \$275,000 to manufacture steel and wire products. A. H. Hunter, A. F. Dorn and H. E. Webster, Buffalo, are the incorporators.

The Hessian Tiller & Tractor Corporation, Buffalo, recently organized, is planning the erection of a plant. George E. Pierce, Edward H. Butler, William Damon and Howard E. Smith, all of Buffalo, are promoting the company.

The Ferguson Steel & Iron Co., 1399 Bailey Avenue, Buffalo, has completed the erection of a machine shop to increase its capacity in the production of structural steel.

Owing to the difficulty in securing materials, the Ford Motor, 2495 Main Street, Buffalo, has closed its plant and will suspend operations for some weeks. About 400 workmen are affected.

The service plant of the Westinghouse Electric & Mfg. Co., Buffalo, replacing its plant destroyed by fire recently, will be equipped to triple the output of the old works. The new plant is that formerly occupied by the Standard Mirror Co., fronting on the Pennsylvania Railroad at Milton Street, comprising a site 146 x 100 x 258 ft., with modern steel and brick buildings.

The State Legislature, Albany, N. Y., is considering a bill providing an appropriation of \$1,000,000 for the organization of a corporation to construct and operate a plant for the manufacture of canal barges. It is said that the proposed works will be located near North Tonawanda, N. Y. The barges, as designed, are estimated to cost about \$25,000 each.

The Three Rivers Machine Tool & Die Corporation, Phoenix, N. Y., has been incorporated with a capital of \$30,000 by C. F. Loomis, M. R. Karge and A. C. Moyer.

The A. L. Swett Iron Works, Medina, N. Y., manufacturer of castings, hardware, etc., has increased its capital from \$200,000 to \$500,000.

Fire Feb. 16 destroyed the plant of the Commercial Iron Works, Penn Yan, N. Y., with loss of about \$30,000.

The Crescent Tool Co., Jamestown, N. Y., is having plans prepared for a power station, with concrete coal storage bins. The equipment will comprise a 1000-kw. steam turbine generator set and boilers and a 1500-hp. gas producer.

The Buffalo Contractors' Plant Corporation, Erie Street, Buffalo, manufacturer of building and hoisting machinery, etc., has purchased a factory building on Erie Street, extending to Henry Street, and will equip and use it as an extension of its present plant.

The Binghamton Bridge Co., Press Building, Binghamton, N. Y., will receive bids the fore part of April for a brick and steel power house at Chenango Forks, N. Y., requiring the installation of two 250-kw. water-turbine-driven generators. A. L. Gilmore, Press Building, is the engineer.

Philadelphia

PHILADELPHIA, Feb. 25.

The Schwerdtle Machine Co., 2009 Kinsey Street, Frankford, Philadelphia, recently incorporated with a capital stock of \$15,000, will specialize in the manufacture of warping and other textile machinery, as well as paper-box and package wrapping machinery. H. G. Schwerdtle, for six and one-half years superintendent for the Stokes & Smith Co., machinery manufacturer, Summerdale Station, Frankford, is president and general manager. Walter G. Denn, for the past 30 years or more engaged in the manufacture of warping machinery, will have charge of that particular department.

The Bureau of Yards and Docks, Navy Department, Washington, has taken bids for the one-story reinforced-concrete plant at the League Island Navy Yard, Philadelphia, for the manufacture of airplanes, estimated to cost \$2,000,000. A one and six-story shop, 200 x 680 ft., of brick and reinforced concrete, will also be erected.

The S. S. White Dental Mfg. Co., 211 South Twelfth Street, Philadelphia, manufacturer of dental instruments, etc., has incorporated in Delaware the S. S. White Dental Co. of Brazil, with capital of \$20,000 to manufacture similar products.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, has arranged for an issue of \$7,500,000 in notes to cover, in part, extensions and improvements to its electric plants and system. Construction has been commenced on a new power station at Chester, to have an initial capacity of about 60,000 kw. and to be operated by the Delaware County Electric Co., a subsidiary.

Day & Zimmerman, Inc., 611 Chestnut Street, Philadelphia, is engineer for the Groton Iron Works, Eastern Point, Groton, Conn., in connection with its new shipbuilding plant now being erected at New London, Conn., at a cost of \$1,000,000. The works will consist of a fabricating shop, 50 x 350 ft., three-story shop, 50 x 100 ft., etc.

The Fallonite Co., 51 Clifton Avenue, Newark, N. J., manufacturer of emery wheels, has leased property at Newtown, Pa., formerly occupied by the Imperial Porcelain Co., for the establishment of a new plant.

The Shaw Pottery Co., Trenton, N. J., has been incorporated with a capital of \$50,000 by James Shaw, Jonas A. Fuld and Enoch Montford.

The New York Shipbuilding Corporation, Camden, N. J., has been granted permission by the State Board of Commerce and Navigation to build new shipways on the Delaware River, with necessary shop structures. It is now having plans prepared for the superstructure for six shipways, 300 x 400 ft.

A one-story, brick and concrete power plant to cost about \$10,000, will be erected by L. S. Leberman, Kensington, Philadelphia. Andrew J. Sauer & Co., 908 Chestnut Street, are the architects.

The Rowe Motor Mfg. Co., Wallace Street, East Downingtown, Pa., is planning to erect a two-story plant, 120 x 200 ft., on Fountain Avenue, Lancaster, at a cost of about \$35,000.

Fire Feb. 18 destroyed a portion of the sheet mill of the Reading Iron Co., Reading, Pa., with a loss of about \$25,000.

The Jeunesville Iron Works, Hazleton, Pa., is building a one-story foundry at a cost of about \$50,000.

The Chester Shipbuilding Co., Chester, Pa., has awarded contracts for five buildings at its plant at a cost of over \$400,000, including a punch shop and mold department, 190 x 500 ft., to cost \$200,000; extensions to the forge and blacksmith shop, to cost \$30,000, making it 100 x 250 ft.; new ship carpenter shop, \$30,000; general storehouse, \$30,000, and a tank building.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg,

Pa., has completed the new building to replace the one recently burned down and will inaugurate operations at once. It will be used for the manufacture of shell cases for the navy and will employ about 800 men. The structure, representing a cost of about \$80,000, was built in 25 days' time by the Austin Co., Cleveland.

Plans have been drawn by Horace W. Castor, Girard Building, Philadelphia, and bids are being taken for the erection of a three-story warehouse, 40 x 120 ft., at Tenth and Hamilton streets, for the Sterling Iron & Steel Co., 1006 Hamilton Street, Philadelphia, scrap dealer.

Baltimore

BALTIMORE, Feb. 25.

The American Propeller & Mfg. Co., 233-249 East Hamburg Street, Baltimore, will build a two-story addition to its plant at Gittings and Jackson streets, 150 x 200 ft., and 18 x 50 ft., at a cost of \$30,000.

W. A. Fingles, Inc., 29 South Howard Street, Baltimore, has been incorporated with \$25,000 capital stock to do architectural metal work. The incorporators are William A. Fingles, William A. Fingles, Jr., and George E. Strobel.

The Maryland Bolt Co., Curtis Bay, Md., is having plans prepared for an addition to cost about \$100,000.

John M. Lawrence has awarded a contract for the construction of a one-story machine and blacksmith shop, 30 x 75 ft., on Sterrett Alley near Hamburg Street, Baltimore, to H. B. Mays.

The War Department, Washington, has awarded contracts for the construction of a plant at St. Helena, Md., for automobile assembling and repair. A site of 100 acres on Colgate Creek has been acquired. The plant will consist of about 50 steel and concrete buildings, estimated to cost \$2,500,000.

The Harlan & Hollingsworth plant of the Bethlehem Shipbuilding Corporation, Wilmington, Del., has commenced the construction of a new shipway.

The Foundation Co., 233 Broadway, New York, has acquired a site on the Savannah River, near Savannah, Ga., and is said to be planning the immediate erection of a yard for the construction of mine sweepers and other vessels, to employ about 2000 men at the start.

The Ketter-Elliott Erection Co., Chicago, has organized the Pensacola Shipbuilding Co., Pensacola, Fla., to construct at that point and operate a steel ship plant for the Government, consisting of shipways, fabricating shops, machine shops, etc., estimated to cost \$600,000. The site has been purchased. A. C. Ketter is president.

Chicago

CHICAGO, Feb. 25.

Several inquiries for screw machines for fuse work await action, but no new business of noteworthy proportions has appeared. Small inquiries have been fairly numerous, with some business resulting, purchasers not being discouraged by deliveries three months or more away. The Standard Steel Car Co., Hammond, Ind., has yet to acquire a great deal of equipment, not having bought as much in the East as was expected.

Though there is betterment in some directions, making shipments is still attended with many difficulties. One firm has a notice that it can resume shipping to the East and several machines which have long been held up are now on their way. Conditions to the north of Chicago are not as good as they were, it being found exceedingly difficult to get machines out of Milwaukee. At Racine a large gas engine was placed on a car—and the car was still in the yards five days later.

Regulations governing priority are drawing tighter. In the applications additional and specific answers to questions are now required, and it is seldom that the required certificate is granted inside of 30 days. Blanket priorities are no longer effective, and the necessary authority must cover each tool individually. Government inspectors in tool-building factories are exercising stricter supervision.

The general contract for the oil refining plant and distributing station which the Inter Ocean Refining Co., 332 South Michigan Avenue, Chicago, will build near Lyons, Ill., has been awarded to the Leonard Construction Co., 332 South Michigan Avenue. The plant will comprise a group of tanks, filter house, pump house, stills, boiler house, etc.

The Benjamin Electric Co., Chicago, and the Royal Enameling & Mfg. Co., Des Plaines, Ill., have been consolidated under the name Benjamin Electric Mfg. Co., the new corporation having a capital stock of \$3,000,000. R. B. Benjamin,

Chicago, is president, and the directorate represents the principal interests of both the former companies. The manufacture of electrical specialties and lighting systems will be continued. Eventually the plant of the new company will be located on a site of 82 acres in Des Plaines, formerly owned by the Royal Enameling & Mfg. Co.

The Leader Iron Works, Decatur, Ill., is planning extensive improvements, including a machine shop, 50 x 200 ft. Work will be started in the near future.

The Peoria Malleable Casting Co., Peoria, Ill., is now operating its new plant on a site of 16 acres at Averyville, and is employing about 60 men. L. E. Roby is president; H. Heminway, vice-president and general manager; C. A. Patison, secretary and treasurer, and Edward Lutton, superintendent.

The J. P. Hand Co., Davenport, Iowa, has been incorporated with a capital stock of \$20,000 by J. P. Hand, Joseph Lewis and B. Simmon, to manufacture automobile parts and storage batteries.

H. E. Pridmore, 1901 South Rockwell Street, Chicago, Ill., has filed plans for the erection of a new one-story machine shop, 45 x 60 ft.

Fire, Feb. 14, destroyed a sub-station of the Union Light & Power Co., Fort Riley, Kan., with loss in electrical equipment of about \$10,000.

The Powell Tractor Corporation, Chicago, has been incorporated in Delaware with a capital of \$500,000 to manufacture motor tractors. John J. Urban, Chicago; John Powell, Elwood, Ind., and J. M. Meyer, Winnetka, Ill., are the incorporators.

Milwaukee

MILWAUKEE, Feb. 25.

While a number of machine-tool manufacturers report that new bookings show a slight slackening, others state they have noted neither a decrease in number nor relief from pressing demands. Makers of milling machines, for instance, continue to receive new business in the same large volume that has characterized their trade for more than a year. Improvement in railroad traffic the past week or 10 days has done much to make prompt deliveries less difficult.

The Winther Motor Truck Co., Winthrop Harbor, Ill., will commence work March 1 on the erection of a new motor truck factory group at Kenosha, Wis., estimated to cost \$125,000, to provide facilities for handling a Government contract for military trucks. The company was organized about 18 months ago by M. P. Winther, and being unable to find suitable quarters in Kenosha, availed itself of an offer of the use of an idle shop building at Winthrop Harbor, a few miles south of Kenosha. The acceptance of Government orders created a need for greatly increased facilities which are expected to be ready about May 15.

The Bruce Boiler Works, Neenah, Wis., has been organized by W. A. Bruce, who recently severed his connections with the Northern Boiler & Structural Works, Appleton, Wis., to engage in business on his own account. The former main building of the Pomeroy Paper Mills Co., Neenah, has been leased and will be equipped for boiler, structural and ornamental iron manufacture.

The Simmons Co., Kenosha, Wis., manufacturer of seamless steel beds, springs, etc., has increased its capital from \$10,000,000 to \$13,000,000. It is stated that the increase carries no special significance, being made to accommodate the expansion of business the past year or more.

The Hartmann-Bodilly-Suess Co., Green Bay, Wis., has been organized with a capital stock of \$25,000 as a consolidation of the Hartmann-Greiling Machinery Exchange and the Nelson Machine Co., Green Bay. It will do general machinery and sheet metal work and repairs, and deal in new and used machine tools, equipment, etc. Headquarters will be in the plant of the Nelson company, 120-126 North Pearl Street. The officers are: President, Carl Hartmann; vice-president, John W. Bodilly; secretary, Paul F. Suess; treasurer, George A. Richardson. Mr. Bodilly is general manager and Mr. Suess, sales manager. Messrs. Hartmann and Richardson will not be active in the management of the business for the present.

The Jenkins Machine Co., 315 North Eighth Street, Sheboygan, Wis., manufacturer of metal and wood-working machinery, has plans for a two-story brick addition, 45 x 60 ft., to cost about \$20,000 with equipment. The architects are Jull & Sixta, Sheboygan. Work will begin about March 10.

Charles Gordon, 424 Wells Building, Milwaukee, dealer in machinery, factory equipment, etc., has incorporated under the style of Charles Gordon, Inc., with a capital stock of \$25,000. The ownership and policy remain unchanged.

The Monarch Fleshing Machine Co., Milwaukee, has been incorporated with a capital stock of \$25,000 by John Kelling,

Henry W. Tews and Ernst Jahn to manufacture an improved machine for tanneries. Other details are not yet available.

The Milwaukee Woodcraft Corporation, Milwaukee, has been incorporated with a capital stock of \$25,000 by representatives of wood-working industries of the city to handle prospective contracts for wooden airplane parts and material now in negotiation. The incorporators are Marshall C. Moss, J. W. Dierckmeier and S. H. Grobben. Further details are not divulged.

The Superior Electrical Co., Superior, Wis., is operating its plant at maximum capacity to fill orders for electric telemotors for the equipment of ships under construction for the Government. The telemotor is a device by which boats are steered and controlled electrically and was invented by M. D. Benson, president of the company. The company is also filling contracts for an electric flashlight device operating in conjunction with steamer whistles.

Detroit

DETROIT, Feb. 25.

The demand for machine tools is not strong. Except for orders placed by companies making munitions, very little business has been transacted. With renewed interest in manufacturing, however, jobbers expect a substantial increase in demand. Building operations are slow, not approaching the records of last year, and falling even below last week's total. Skilled labor is in great demand, and local shipbuilding firms are operating to capacity on Government orders. About 9000 men are employed in this work, with a strong call for more skilled workmen. Other fields for skilled men will be opened when the new munition plant of Dodge Brothers, the Lincoln Motor Co., manufacturer of Liberty motors, and the Detroit Shell Co. begin operations on a large scale.

The Industrial Terminal Corporation, Detroit, has taken over the Michigan Avenue branch of the Saxon Motor Co. at a consideration of \$800,000. It is understood that munitions will be manufactured.

The Saginaw Shipbuilding Co., Saginaw, Mich., is rushing work on boats for the Government. About 300 men are now employed and more are being added daily. The Government has guaranteed delivery of materials. W. J. Wickes has been re-elected chairman of the board and George H. Hannum secretary.

The Field Mfg. Co., Owosso, Mich., will shortly increase its working force, due to increased demand for its motor trucks.

The Peninsular Stove Co., Detroit, has let contract for an addition to its factory at Fort and Tenth streets.

The Howell Motors Co., Howells, Mich., is increasing its production of electric motors.

The Hancock Mfg. Co., Charlotte, Mich., manufacturer of brass goods, has increased its capital from \$100,000 to \$200,000.

Fire, Feb. 13, destroyed a portion of the works of the Keystone Type Foundry, West Larned Street, Kalamazoo, Mich., consisting of a five-story building, with loss estimated at \$100,000.

The Seneca Mining Co., operating the Seneca mine, near Houghton, Mich., is planning for the immediate rebuilding of its machine and forge shops, recently destroyed by fire.

Cleveland

CLEVELAND, Feb. 25.

New demand for single machines and up to lots of a half dozen is fairly active, orders coming for the most part from manufacturers engaged in shell, motor truck, airplane and tractor work. The call is largely for lathes and milling machines. The American Clay Machinery Co., Bucyrus, Ohio, has placed additional orders for shell making equipment, including 10 24-in. lathes, and 12 grinding machines. A large amount of second-hand machinery from Canada is being offered in this market by plants having completed their British contracts and having no further orders in sight. It is believed that because of increased production of shells in England the greater part of the demands of the army will be supplied by plants in Great Britain, with a considerable slackening of shell production in Canada.

The Glenn L. Martin Co., Cleveland, has acquired a 50-acre site on St. Clair Avenue, and the Nickel Plate Railroad, on which it will immediately begin the erection of a plant for the manufacture of airplanes. The first unit, for which the contract has been placed, will be 220 x 300 ft. It has purchased about all the machinery required for its first unit, but in a month or two expects to issue a new list of requirements. Its

plan is to begin the erection of a second unit as soon as the first is completed. The plant will operate entirely on the manufacture of fighting airplanes, for which it has Government orders. It is the intention after the war to manufacture commercial airplanes. The company is now operating an experimental plant.

The Cleveland Tractor Co., Cleveland, has placed a contract for another one-story addition to its plant, 230 x 440 ft.

The Cleveland Heater Co., Cleveland, has taken an order for the manufacture of parts for Rolls-Royce airplane motors and is buying some machine tool equipment.

The National Electric Lamp Co., Cleveland, has purchased the adjoining plant of the Abbott Corporation on East 152nd Street, recently built for the manufacture of automobiles. It is a one-story building, 110 x 631 ft., and will be used for manufacturing purposes.

The Northern Fire Appliance Co., Cleveland, recently started operations in a new plant on East 152d Street, 40 x 100 ft. It manufactures fire appliance equipment for motor trucks.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has leased the plant of the Baxter Stove Co., Mansfield, Ohio, and, it is reported will make extensions and improvements and transfer its manufacture of electric cooking ranges and other electric heating devices such as toasters, flat irons, curling irons, etc., from Newark, N. J., to that city. It is announced that the New Method Stove Co., Mansfield, will furnish the stamped steel bodies for the electric stoves and various steel stampings for other electrical devices.

The Sailer-Melvin Co., Massillon, Ohio manufacturer of lock washers contemplates the erection of a new plant, 40 x 150 ft.

It is announced that the Independent Motor Co. will move its plant from Port Huron, Mich., to Youngstown, Ohio, where it has acquired the property of the Youngstown Engineering Co. and that a new company will be formed with a capital stock of \$300,000. H. C. Mikkelsen, Charles L. Smythe and other Youngstown men are interested.

The plant of the L. S. Denney Steel Plate & Boiler Co., Mt. Vernon, Ohio, was destroyed by fire a few days ago.

The Power Mfg. Co., Marion, Ohio, has placed a contract for the erection of a one-story addition, 82 x 200 ft.

The Imperial Electric Co., Akron, Ohio, will shortly place a contract for the erection of a two-story brick, steel and reinforced concrete factory, 60 x 100 ft.

The Navy Department has placed with the Wellman-Seaver-Morgan Co., Cleveland, an order for a 250-ton gun handling gantry crane for the proving ground near Sandy Hook.

Cincinnati

CINCINNATI, Feb. 25.

Local machine tool builders are making estimates on a large list of lathes and planing machines issued by the Worthington Pump & Machinery Corporation, which are intended for an Eastern plant and not for its Cincinnati works.

Contracts for munitions have been let quite freely to local and nearby manufacturers. A Columbus, Ohio, firm recently secured a Government contract for a large number of airplane bombs. Other nearby companies have orders for shell forgings.

Shipments of less than carload lots are easier to make to Eastern points, but there is yet a ban on carload freight. Shipments for Government plants, however, are now going forward at a much better rate. Some complaint is heard as to the slow deliveries of castings. Foundries have been handicapped by a coke shortage, which is now only slightly improved.

G. C. Hodgson, Dayton, Ohio, has purchased the plant of the Dayton Screw Co., organized a year ago by W. T. Anderson and others. It is reported that the new company will add to the equipment already installed.

It is rumored that the Victor Rubber Co., Springfield, Ohio, contemplates removing its plant to more commodious quarters in Springfield or to another city. It will be reorganized at an early date and the capital stock increased.

The Okey Machine Co., Columbus, Ohio, has had plans prepared for a one-story brick and steel machine shop, 80 x 100 ft., to be erected at Water and Naughten streets.

The Marvel Tractor Co., Columbus, is contemplating the erection of a factory building. At present its tractors are made under contract by the Jaeger Machine Co.

It is reported that the Blair Motor Truck Co., Newark, Ohio, will be reorganized and its capital stock increased to \$1,500,000. A move is also on foot to increase the capacity of the plant.

The Schroeder Headlight Co., Evansville, Ind., has commenced work on the construction of a new plant.

The Central South

LOUISVILLE, Feb. 25.

Fair weather has resulted in a better outlook for plant enlargements and new developments. In the past few days permits have been issued for additions to several local plants, with indications of more to follow. Boiler and pump manufacturers are principally occupied with Government orders.

The plant of the Lonsdale Foundry Co., Knoxville, Tenn., which has been closed since March, 1917, has been leased by the Lonsdale Stove Co., a new company, which has been incorporated with a capital of \$2,500 to manufacture small stoves and do other foundry work. A. E. Layman, E. A. Layman, Herman Wilhite, J. V. Ryner and S. E. Moore are the incorporators.

The boiler room of the Voss Table Co., Louisville, was destroyed by a fire Feb. 18, which also damaged a branch of the plant of the Embry Box Co.

John G. Duncan & Sons, Knoxville, Tenn., dealers in machinery, are asking prices on two steam-driven air compressors of 500 cu. ft. and 1500 cu. ft. capacity respectively; Waymouth lathe; 16 to 24-in. double surface planer and matcher; and a heavy four-sided planer for dimension stock, all second-hand.

Elmer Little, Owensboro, Ky., is planning to manufacture a new ditching and grading machine, upon which he recently obtained a patent.

Fire Feb. 13 destroyed the plant of the Memphis Furniture Co., Memphis, Tenn., with loss estimated at \$150,000.

The Sistersville Acetylene Welding Co., Sistersville, W. Va., has been incorporated with a capital of \$5,000. C. T. and B. F. Webb and J. J. Kelly are the incorporators.

Indianapolis

INDIANAPOLIS, Feb. 25.

The Columbia Battery Co., South Bend, Ind., has been incorporated with \$10,000 capital stock to manufacture storage batteries. The directors are Otto M. Knoblock, Frank L. Stedman and William B. Starr.

The Johnson Motor Wheel Co., South Bend, Ind., has been incorporated with \$100,000 capital stock to manufacture wheels and machinery. The directors are Herbert E. Marshall, O. C. Decker and A. C. Schubert.

The Sheller Wood Rim Mfg. Co., Portland, Ind., has increased its capital stock from \$25,000 to \$50,000.

The Briant Specialty Co., Indianapolis, has been incorporated with \$20,000 capital stock to manufacture metal articles. The directors are Briant Sando, H. C. Grannis, H. G. Parker, E. C. Miller and H. G. Power.

The Goodwin Co., Indianapolis, has been incorporated with \$15,000 capital stock to manufacture refrigerators. The directors are Harry E. Goodwin, Thomas F. Snyder and William G. Kreis.

The Interstate Picture Corporation, South Bend, Ind., has been incorporated in Delaware with a capital of \$1,000,000 to manufacture motion picture machines. George T. O'Dell, South Bend; Byron S. Vail and Marshall M. Shumaker, Fort Wayne, Ind., are the incorporators.

St. Louis

ST. LOUIS, Feb. 25.

The St. Louis Woodwork Mfg. Co., St. Louis, has been incorporated with a capital stock of \$100,000 by John S. Hunt, Sam G. Hunsaker, Fred W. Fegel, John T. White, Fred W. Bensing, and others, and will equip a plant to manufacture airplanes.

The Hosch Mechanism Corporation, with offices at Fifteenth and Olive streets, St. Louis, has been incorporated with a capital stock of \$200,000 by W. E. Hosch, G. Carlton Hosch, and others, to manufacture computing machinery.

The Henryetta Gin Co., Henryetta, Okla., Roy R. Reynolds, H. J. Butterly, and others interested, will install about \$15,000 worth of cotton gin equipment.

The Helena Gas & Electric Co., Helena, Ark., has increased its capital stock from \$300,000 to \$500,000 and will enlarge its plant and install new equipment.

The Little Rock Railway & Electric Co., Little Rock, Ark., will install turbo generating equipment to cost \$200,000.

Clinton, Miss., under the direction of the mayor, will install oil-burning equipment in its electric light and power plant.

The Kingston Ice & Light Co., Kingston, Okla., will rebuild its electric plant destroyed by an explosion with a loss on equipment of \$25,000.

Samuel A. Neville will equip a plant at Meridian, Miss., for building freight cars and other railroad equipment.

The Ozark Oil & Refining Co., Fort Smith, Ark., capital \$1,500,000, Alex. Calvert, C. E. Dito, and others interested, will install equipment to increase its capacity 100 per cent.

The Oklahoma-Kansas Refining Co., capital \$1,000,000, A. M. Halloran, Ferris Giles, and others of Wilmington, Del., interested, will equip a refinery at Oklahoma City, Okla.

The Oklahoma Lubricating Co., A. W. McSpaden, Tulsa, Okla., president, will equip a lubricating oil plant at Oklahoma City, Okla., and purchase about \$100,000 worth of machinery.

The Goodeagle Refining Co., Baxter Springs, Kan., will equip a pipe line to Picher, Okla., and install oil pumping machinery.

The Sweaney Mfg. Co., West Memphis, Ark., A. X. Miller, manager, will install about \$25,000 worth of machinery to cut dimension stock.

The Missouri, Kansas & Texas Railway Co., F. Ringer, chief engineer, Dallas, Tex., will equip a 300-ton mechanical coal chute at McAlester, Okla.

The cities of Texarkana, Ark. and Tex., will install sewage disposal plant equipment to cost in excess of \$127,000. T. L. Peden, Houston, Tex., is consulting engineer.

The Kansas City Nut & Bolt Co., Kansas City, Mo., will re-equip the portion of its plant recently destroyed by fire.

The Nunn Electric Co., Oklahoma City, Okla., will rebuild its plant recently destroyed with a loss of \$40,000.

The Electric Light and Water Works, Canton, Miss., is in the market for surface condensing equipment. John T. Sharp is in charge.

The Kardell Tractor & Truck Co., St. Louis, is considering the construction of a plant at Oldsmar, Fla., for the manufacture of tractors.

Fire Feb. 9 destroyed the electric power plant of the Kingston Ice & Light Co., Kingston, Okla., with loss estimated at \$25,000.

The Witte Engine Works, Sixteenth Street, Kansas City, Mo., manufacturer of gas engines, etc., has awarded a contract for the erection of a one-story addition to cost about \$10,000.

Texas

AUSTIN, Feb. 23.

It is announced that the Sinclair Gulf Corporation will construct an oil refinery at Fort Worth, in addition to the one to be built at Houston. The Sinclair Gulf Pipe Line Co., Portsmouth, N. H., subsidiary of the Sinclair Gulf Corporation, which was recently granted a permit to do business in Texas, will construct an oil pipe line from the Oklahoma fields to Houston, via Fort Worth.

The Galveston Dry Dock & Construction Co. will build a floating dry dock of 10,000 tons capacity upon Pelican Island, adjacent to Galveston. The Emergency Fleet Corporation has agreed to advance 80 per cent of the cost of construction, reimbursement to be made after the close of the war. Machine and repair shops will be built in connection with the project.

The Lone Star Shipbuilding Co., Beaumont, plans to enlarge its plant to construct steel ships. It has a Government contract for the construction of eight wooden vessels. J. J. Scheulteliser is general manager.

California

SAN FRANCISCO, Feb. 19.

A lull in the demand for machinery, especially for smaller tools, is noted, with deliveries in some cases more easily obtained. The falling off in demand is explained by the season of the year, high prices and far-off deliveries. Buying of tools in the Eastern markets has been much easier for several weeks, and now that an embargo has been placed on all exports, except by permit, it is believed that many machines made for foreign use will become available in the domestic market.

Shipbuilding still holds the attention of machinery men and many yards continue to make improvements. New projects are constantly cropping up, some with a fair prospect of materializing.

The Union Iron Works, San Francisco, announces that it will begin construction at once on two plants at its Alameda shipyards to build submarines, at a cost of about \$1,000,000. The past year the company spent between \$6,000,000 and \$7,000,000 in improvements and at present employs over 12,000 men in its San Francisco and Alameda yards.

The Rolph Shipbuilding Co., San Francisco, has been organized by Mayor James Rolph, Jr., and associates and has completed plans for the erection of a small shipbuilding plant on the Alameda estuary. It is stated that the initial outlay will be a quarter of a million dollars and that probably six ways will be built.

The Barnes & Tibbitts Shipbuilding Co., Alameda, has about completed its new plant at a cost of \$125,000. While it is expected to build wooden vessels, the plant is so arranged that it could readily be changed to handle steel vessels.

The Union Construction Co., San Francisco, has obtained an extension on its lease of waterfront property in Oakland, where it was announced it proposed to build shipyards. It is stated that the company has been financed and that W. W. Johnson, president, is now in Washington in conference with the Emergency Fleet Corporation concerning contracts.

The Eureka Shipbuilding Co., Eureka, Cal., is preparing to build a plant adjoining that owned by James Rolph, Jr., of San Francisco, for the construction of wooden vessels.

The Auto Mfg. Co., Milwaukee, is seeking information regarding Berkeley, with the view of erecting a factory.

The Butler-Veitch Co., Berkeley, has filed papers of incorporation, with a capitalization of \$900,000. The directors are C. L. Butler, Lloyd Veitch, H. D. Hadenfeldt, T. L. Baumgarten and Roy Bronson, all of Oakland. The company plans to manufacture automobiles and motor vehicles, motors, engines, airplanes, parts and accessories.

The Standard Gas Engine Co., Oakland, has completed plans and specifications for increasing its foundry capacity to double its present output. This is in addition to the recently announced addition to its main factory building and machine shop, work upon which is about completed.

The Pacific Electric Railway Co., Los Angeles, is having plans prepared for the erection of 14 new shop buildings at its works at Torrance, including machine and forge shops. The total cost is estimated at \$1,000,000.

The Cousins-Howland Tractor Co., Hanford, is erecting a machine shop for the repair of heavy tractors.

The Reliance Trailer & Truck Co., Inc., San Francisco, has been incorporated with a capital of \$25,000 by J. R. Kronetsky, F. E. Carroll, J. M. Litchfield, G. G. Wilkens and S. W. Main, to manufacture automobile trucks, trailers and attachments.

The Pacific Northwest

SEATTLE, WASH., Feb. 19.

The entire plant of the Wallace Shipyards, North Vancouver, B. C., will be remodeled and new equipment installed at a cost of \$100,000. Hodgson & King, London Building, Vancouver, have the contract for construction work.

The Manchester Box & Lumber Co., The Dalles, Ore., will construct a new plant, 50 x 140 ft., to cost \$60,000.

The Sidney Rubber Roofing Co., Vancouver, B. C., has decided to locate its proposed new plant at Port Moody. It will cost \$125,000.

Edgar Evans, Naches, Wash., will construct a sawmill and box factory at Yakima, with a daily capacity of 25,000 board ft. and 3000 boxes.

The Norway-Pacific Construction & Dry Dock Co., with head offices in Seattle, has asked the United States Shipping Board for permission to establish a shipbuilding plant in Everett, Wash. The company plans to bring all of its skilled shipbuilders from Norway.

The Western Drop Forge Co., Seattle, will complete the first unit of its plant within six weeks, which will be the first drop-forge plant in this section. It will manufacture small marine forgings and later machinery will be installed to manufacture tools, clamps and logging equipment. R. E. Lunkley is president and manager.

The Wenatchee Valley Gas & Electric Co., Wenatchee, Wash., will build a power plant with a capacity of 1000 hp. at Chelan Falls. George D. Brown is president.

The British-American Shipbuilding & Engineering Co., Vancouver, B. C., has been incorporated with capital stock of \$1,000,000. It has obtained a site on Kitsilano Reserve, and, it is reported, has contracts for 20 auxiliary wooden schooners from the Imperial Munitions Board.

The Standifer Shipbuilding Corporation, Vancouver, Wash., recently secured six additional contracts from the Government. The plant will be placed on two-shift basis, and present force doubled.

Canada

TORONTO, Feb. 25.

Permits for the superstructure of the main buildings of the Dominion Shipbuilding Co.'s plant at the foot of Bathurst Street, Toronto, have been granted. The estimated cost of this portion of the works is \$175,000, and the entire plant will cost \$2,500,000. The buildings will be of steel and hollow tile, 198 x 469 ft., and with structures to be erected later the plant will have a frontage of 800 ft. The work is being carried on by the Harbor Commissioner's department.

The Buckeye Traction Ditcher Co., incorporated in Ohio, has been granted permission to manufacture iron, steel, machinery, tractors, implements, etc., in Ontario, with a capital stock of \$50,000. John J. Wallace, Chatham, Ont., represents the company.

The Herbert Morris Crane & Hoist Co., Ltd., which recently completed a plant at Niagara Falls, Ont., will increase its capital stock from \$100,000 to \$250,000.

The Atlas Woodenware Co., Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by Philippe Saumur, Edward Halley, Arthur R. W. Plimsoil and others to manufacture articles in which wood or metal is used.

The Canadian Cotton Co. is building an addition to its foundry on James Street North, Hamilton, Ont., at a cost of \$60,000.

The lithographing and engraving plant at London, Ont., owned by T. M. Knowles, was destroyed by fire Feb. 22, with a loss of \$20,000.

A. L. Beeler, Bridgetown, N. S., has leased property along the north side of Annapolis River and will erect a shipbuilding plant.

Moirs, Ltd., Argyle and Duke streets, Halifax, N. S., will build a two-story box factory to cost \$60,000, for which bids will be called in the near future. S. P. Dumaresq, St. Paul Building, is the architect.

The Nanaimo City Gas Co., 59 Commercial Street, Nanaimo, B. C., is having plans prepared for the erection of an addition to its plant and will install new machinery to cost \$40,000. W. W. Lewis is manager.

The Dominion Cement Co., Ltd., 92 Notre Dame Street East, Point aux Trembles, Que., has secured a site on which it will commence at an early date the erection of a cement plant to cost \$100,000. J. A. Vinet is secretary-treasurer.

The Grand Trunk Pacific Railway Co., Vancouver, B. C., is reported to be making arrangements for the erection of a shipbuilding plant at Prince Rupert, B. C. W. H. Hinton is chairman.

The Gas Committee, St. Thomas, Ont., proposes to make improvements to the gas plant and install equipment to cost \$40,000.

The Ontario Wind Engine & Pump Co., Ltd., Liberty Street, Toronto, will build an addition to its plant to cost \$10,000.

The Victoria Shipbuilding Co., Victoria, B. C., will build an addition to its plant to cost \$70,000. J. H. Price, care of Cameron Genoa Mills, Ltd., Old Indian Reserve, Victoria, is president.

The Board of Control, Toronto, is having plans prepared for the erection of a plant to manufacture street cars, etc. It will be completed and ready for operations by 1921. R. C. Harris is commissioner of works.

The White Sewing Machine Co. of Canada, Suffolk Street, Guelph, Ont., has let contract to G. A. Scroggie, 400 Woolwich Street, for the erection of an addition to its plant to cost \$15,000.

The mill owned by the Nova Scotia Manganese Co., New Ross, N. S., was totally destroyed by fire with a loss of \$100,000. It will be rebuilt and new machinery purchased.

The Utilities Commission, London, Ont., will purchase two electrically driven waterworks pumps, with a capacity of 600 gal. per min. each. Philip Pocock is chairman.

The Beaver Brass & Ornamental Iron Co., 24 Adelaide Street West, Toronto, will build a kiln at the rear of 8 Ryerson Street, to cost \$10,000.

Government Purchases

WASHINGTON, Feb. 25.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, for supplies for the naval service as follows:

Schedule 1721, for Washington—Two wire feed screw machines, four grinding machines, one motor-driven thread milling machine and four motor-driven die-sinking machines.

Schedule 3323½, for Brooklyn—One motor-driven power

punch, one milling machine and one steam hammer, opening of March 1.

Schedule 3327½, for Washington—Forty bench trimmers, twenty-four universal wood trimmers, dowel rod machine, opening of March 4.

Schedule 3333½, for Norfolk—Two trimming presses, opening of March 1.

Schedule 3339½, for Norfolk—Two board drop hammers; for Brooklyn and Norfolk, circuit breakers; for Philadelphia and Norfolk, atmospheric-testing apparatus, opening of March 4.

Schedule 3340½, for Norfolk—One steam drop hammer, opening of March 8.

Schedule 3341½, for Norfolk—One shear machine, opening of March 8.

Schedule 3342½, for Key West—Two torpedo air steam-driven compressors, opening of March 8.

Sealed bids are asked by the Bureau of Yards and Docks, Navy Department, Washington, under specification 2775, for traveling cranes for the Washington Navy Yard, estimated to cost \$60,000; and under specification 2840, for an electric traveling crane for a storage building at Philadelphia estimated to cost \$14,000, bids in both cases being received until March 4.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, Feb. 8, schedule 2669½, construction and repair, class 1, Puget Sound, for furnishing one gantry crane—Penn Bridge Co., Beaver Falls, Pa., \$29,390; Whiting Foundry Equipment Co., Harvey, Ill., \$32,080.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, Feb. 15 and Feb. 18, for supplies for the naval service as follows:

Schedule 3019½, Construction and Repair—Class 21, Bid A, Puget Sound—Two wood lathes—No bid. Bid B, f.o.b. works—Bid 129, \$6,000.

Schedule 3018½, Steam Engineering—Class 2, f.o.b. Puget Sound—One flange facing machine—Bid 40, \$2,500.

Schedule 3156½, Construction and Repair—Class 1, Philadelphia—Four boring machines: Bid A, with electrical equipment—Bid 1, \$450; 12, \$316, \$745 and \$210; 21, \$545.14; 32, \$395; 36, \$457. Bid B, without electrical equipment—Bid 1, \$371; 21, \$413.64; 32, \$259.75; 36, \$359. Class 2, Philadelphia—One rod machine, hand feed: Bid A, with electrical equipment—Bid 1, \$213; 21, \$482. Bid B, without electrical equipment—Bid 1, \$124; 21, \$369.

Schedule 3020½, Construction and Repair—Class 21, Norfolk—One square shear—Bid 56, \$2,559 and \$2,493.

Schedule 3105½, Steam Engineering—Class 41, Brooklyn—Four 12 in. gap lathes and four sets spare parts—Bid 20, \$1,158; 39, \$1,340 and \$1,295; 41, \$2,115; 54, \$1,214; 61, \$942.25. Class 42, Brooklyn—Four bench grinders and eight sets carbon brushes—Bid 8, \$74.40; 25, \$79; 32, \$70; 36, \$65; 29, \$40; 75, \$105.25.

Schedule 3107½, Steam Engineering—Class 43, Philadelphia—One surface grinder—Bid 57, \$4,853; 69, \$6,058.

Schedule 3128½, Steam Engineering—Class 91, f.o.b. cars—Two portable cylinder boring machines—Bid A, equipped with electric motors—Bid 36, \$240. Bid B, equipped for belt drive—Bid 36, \$585; 60, \$350.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 1, American Woodworking Machinery Co.; 8, Corning Glass Works; 12, Monarch Machinery Co.; 20, Fairbanks Co.; 21, J. A. Fay & Egan Co.; 25, Hisey-Wolf Machine Co.; 29, Jersey Cloth Mills; 32, Kemp Machinery Co.; 36, Manning, Maxwell & Moore, Inc.; 39, D. Nast Machinery Co.; 40, Newton Machine Tool Works, Inc.; 41, Niles-Bement-Pond Co.; 54, Philip Smith Mfg. Co.; 56, Sherritt & Stoer Co.; 57, W. E. Shipley Machinery Co.; 60, H. B. Underwood & Co.; 61, Van Dyck-Churchill Co.; 69, F. H. Lovell & Co.; 75, Roth Bros. & Co.; 129, Trevor Mfg. Co.

The following bids were received by the purchasing officer, general engineer depot, U. S. Army, Washington, Feb. 20, under circular proposal 674, for furnishing turret lathes:

Bid 1, Warner-Swasey Co., Cleveland.

2, Gisholt Machine Co., Madison, Wis.; discount of ½ per cent in 10 days.

3, Jones & Lamson Machine Co., Springfield, Vt.

4, International Machine Tool Co., Indianapolis; discount of 1 per cent for cash in 10 days.

5, Monarch Machinery Co., Philadelphia; discount of 1 per cent in 10 days.

6, Allied Machinery Co. of America, 120 Broadway, New York.

Item 576—Three turret lathes, 2½ x 30¼ in.—Bid 1,

\$3,140; 2, \$1,875; \$174, \$225, \$422, and \$382; 3, \$1,632; 5, \$4,139; 6, \$3,361.

Item 577—Seven turret lathes, 3½ x 45¼ in.—Bid 1, \$4,330; 2, \$3,325; \$217, \$317, \$515, and \$477; 3, \$1,632; 4, \$5,375; 5, \$4,139; 6, \$4,584.

Item 578—One turret lathe, 6¼ x 60 in.—Bid 2, \$4,950; \$325, \$444, \$744, and \$555; 4, \$8,572; 6, \$4,950.

NEW TRADE PUBLICATIONS

Wood and Metal Working Machinery.—Oliver Machinery Co., Grand Rapids, Mich. Folder. Gives illustrations of an extensive line of wood and metal working machinery which includes lathes of all kinds, sawing, surfacing, shaping, boring, mortising machines, etc. Mention is made of a 16-in. heavy-duty engine lathe and an illustration and a brief description of this tool are included.

Steel Wheels for Trucks.—Detroit Pressed Steel Co., Detroit. Folder. Deals with a line of heavy duty pressed steel disk wheels for trucks and tractors. Drawings of the three styles of wheels which are made are presented, there being practically no text in the folder.

Aluminum Alloys.—Aluminum Castings Co., Cleveland. Circular. Relates to the use of Lynite and Lynux alloys for making aluminum, brass and bronze castings.

Phosphor Bronze Castings.—Titanium Bronze Co., Inc., Niagara Falls, N. Y. Pamphlet. Treats of a line of phosphor bronze alloys for use in making castings. Illustrations of parts made with these alloys and photomicrographs supplement the text description and a condensed table of specifications for two alloys, one for gears and the other for bearings, is included.

Resistance Metals.—Electrical Alloy Co., Morristown, N. J. Catalog No. 9. Contains brief descriptions and price lists of an extensive line of resistance materials. The materials covered include several alloys, nickel and Monel metal. Tables giving the properties of the different metals and the sizes in which they can be supplied are given.

Ball Bearings.—Transmission Ball Bearing Co., Inc., Buffalo. Catalog No. 3. Size, 6 x 9 in.; pages, 52. Describes and illustrates an extensive line of ball bearings for power transmission. These include standard and heavy duty types for shafting hangers, pillow blocks, loose pulleys, clutch sleeves, etc. A brief account of the development of the bearings is presented together with the results of tests which have been made upon them. Tables of sizes are presented in each case and a number of views of applications of the bearings as well as plants in which they have been installed supplement the text matter.

Grinding and Polishing Machines.—St. Louis Machine Tool Co., St. Louis, two circulars. The first illustrates a two-wheel grinding machine in which the frame is cut away under the driving pulley and the feet are turned inward out of the operator's way. A brief description and a condensed table of specifications are given together with a number of illustrations of different sizes and types of machines. The other circular pertains to a line of overhanging polishing machines in which a special form of bearing construction is used. Like the other circular a brief description and condensed table of specifications of one size of machine are given with illustrations of the other sizes that are built.

Hydraulic Machinery.—Charles F. Elmes Engineering Works, Morgan and Fulton streets, Chicago. Loose leaf catalog. Deals with an extensive line of hydraulic machinery which includes presses of various kinds, boring bars, etc. Each piece of machinery is given a separate leaf which contains an illustration and brief description and condensed table of specifications. The catalog is divided into sections each of which is indicated by tabbed index leaf.

Molding Machines.—International Molding Machine Co., 2614 West Sixteenth Street, Chicago. Catalog No. 17. Refers to a line of molding machines comprising some 18 different types. The construction and operation of the various machines is described and in some cases illustrations of the machines in use and the work which they have produced are presented. The machines covered include turn-over, jarring, squeezing and stripping plate types for various kinds of work.

Superheaters.—Power Specialty Company, 111 Broadway, New York. Pamphlet. Calls attention to a line of superheaters and the advantages of using them in connection with the employment of steam for power purposes. Illustrations of the different forms of superheaters that can be supplied are presented together with views of a number of plants in which they have been installed. Mention is made of units for use on locomotives and steamships and for portable work.